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On the Meaningfulness of Behavior: An Expectancy \times Value Approach

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Abstract

Our research examines people's concept of 'meaningful behavior' from an expectancy x value perspective. Specifically, we argue that people consider two elements when inferring the meaningfulness of behavior: the value of the goals that the behavior relates to and the degree to which the behavior is useful for the achievement of these goals. A series of five studies demonstrates that behavior is considered to be 'meaningful' if it is highly instrumental for a highly valued goal. Our expectancy x value approach offers a straightforward yet crucial perspective of how people infer whether or not everyday life behaviors are meaningful to them. The implications of our findings for research on meaningfulness, meaning-regulation, and sense making are discussed.

Keywords: meaning, value, instrumentality, self-regulation

On the Meaningfulness of Behavior: An Expectancy \times Value Approach

Psychological research has recognized humans' important need to perceive life as meaningful (e.g., Greenberg, Koole, & Pyszczynski, 2004; Heine, Proulx, & Vohs, 2006). Meaningfulness has been found to correlate with factors such as life satisfaction, happiness, and work enjoyment (e.g., Bonebright, Clay, & Ankenmann, 2000; Chamberlain & Zika, 1988; Debats, Van der Lubbe, & Wezeman, 1993), and a lack of meaningfulness is associated with, for example, decreased well-being, depression, anxiety, and substance abuse (Adler & Fagley, 2005; Debats et al., 1993; Harlow, Newcomb, & Bentler, 1986; see also Steger, Frazier, Oishi, & Kaler, 2006). Not surprisingly, an increased amount of psychological research has turned to the investigation of how people derive and maintain a sense of meaningfulness. In social psychology, most research has focused on the many consequences of threats to perceptions of meaning (e.g., existential threats such as death, uncertainty, boredom, and ostracism; Case & Williams, 2004; Greenberg et al., 2004; Van den Bos, 2001; Van Tilburg & Igou, 2012; Williams, 2002) and its subsequent consequences on meaning maintenance strategies such as fairness behavior (Van den Bos, 2001), nostalgia (Sedikides, Wildschut, & Baden, 2004), or worldview defense (e.g., Greenberg, Solomon, & Pyszczynski, 1997; see also Heine, et al., 2006; Van Tilburg & Igou, 2011a).

Notwithstanding the central role that the concept of meaning plays within the abovementioned research, definitions of this concept are typically vague, sometimes implicit, and often inconsistent. On the one hand, meaning has been associated with terms such as purposefulness, personal growth (e.g., Ryff & Singer, 1998), self-transcendence (e.g., Seligman, 2002), or authentic goal pursuit (Kasser & Sheldon, 2004). On the other hand, Heine and colleagues (2006) suggests that 'meaning is relation', which is described as "what connects things to other things in expected ways" (pp. 90-91). Similarly, Baumeister (1992) identifies meaning as a "shared mental representation of possible relationships among things,

events, and relationships” (p. 15), and other researchers emphasize that meaning is closely related to coherence and need for closure (e.g., Dechesne & Kruglanski, 2004; Kenyon, 2000; see also Baumeister, 1992, p.17). These definitions have their merits, however, a more precise conceptualization is required in order to increase the predictability of people’s evaluations of *behavior*, especially when it relates to meaning-regulation processes. Moreover, a conceptualization of meaning should be tested *empirically* to ensure that this complex concept bears relevance to the use of the term in everyday life.

Our approach builds on the assumption that expectancy x value processes underlies how *people’s understandings of meaningful behavior* fits into the broader assumptions of these meaning-regulation processes. In this respect, we are shifting from the abstract concept of meaning as ‘relation’ to the question of what people understand as meaningful behaviors in everyday life. In order to understand the role of meaning in relation to behavior, it is important to make a distinction between an epistemic and a teleological perspective on ‘meaning’.

Epistemic Meaning and Teleological Meaning

Notwithstanding the plurality of meaning conceptualizations, it appears that research on meaning can be roughly divided into two main areas, reflecting the philosophical traditions of epistemology and teleology: meaning as a sense making process and meaning as an evaluation of the functionality of behaviour, respectively.

According to the Oxford dictionary (2012), epistemology involves the study of knowledge and its validity, which is a—of course—a broad field. In psychology, epistemology involves a wide range of research areas, including general models of information processing, language acquisition and production, biases in judgments and decision making and many more. We are here concerned with the concept of ‘meaning’ within this perspective. *Epistemic meaning* reflects primarily the extent to which attributes

are consistent with our knowledge and expectations. The epistemological perspective thus concerns the meaning of concepts, how these meanings are created, and how they are validated or protected. The focus on epistemic meaning is, for example, reflected in research on reactions to the violation of expected relations (e.g., Heine et al., 2006; Proulx, Heine, & Vohs, 2010; Randles, Proulx, & Heine, 2011). Moreover, epistemic meaning is an essential element of the cultural worldviews discussed in terror management theory (e.g., Dechesne, & Kruglanski, 2004; Greenberg et al., 1986; 1997), and a similar concept—*meaning as comprehensibility*—has been proposed by Janoff-Bulman and Yopyc (2004) in the context of making sense of extreme events such as trauma. Stimuli or experiences that do not make sense are deemed meaningless, including death, absurd stories (Proulx & Heine, 2009), and particular modern art (Landau, Greenberg, Solomon, & Pyszczynski, 2006; Van Tilburg & Igou, 2011b).

According to the Oxford dictionary (2012), teleology involves the study of the purpose and function of phenomena. This second perspective on meaning revolves around the functionality and significance of specific acts, decisions, or subjective states. Teleological meaning is reflected in research that links meaningfulness to concepts such as purposefulness, personal growth, and self-transcendence (e.g., Ryff & Singer, 1998; Seligman, 2002; see also Deci & Ryan, 2000, Ryan & Deci, 2004). Along the same lines, Kasser and Sheldon (2004) argued that meaningfulness is reflected in people's attempt to fulfill their "potentials and possibilities" (p. 480). Essentially, teleological meaning refers to a psychological appraisal of the relation between phenomena or behaviors (e.g., charity support) with their goals or functions (e.g., giving to charity as a means to help others) and the value of these goals to the individual.

To illustrate the difference further, consider the example of *running on a training course*. An *epistemic* approach to meaning would pose questions such as "What does

‘running on a training course’ mean?” or “What knowledge is involved in running on a training course?”. A *teleological* approach to meaning would pose questions such as “Why would one be running on the training course?” and “How well would this behavior serve the purpose that it may have?”. In other words, in light of the teleological perspective, behavior typically involves an evaluative judgment pertaining to its functionality in the pursuit of goals with particular value, which relates to the components in expectancy \times value models of motivation. We argue that in everyday life people are concerned with the question of whether or not their or other people’s activities are ‘meaningful’ in teleological terms.

Expectancy \times Value Processes in Teleological Meaning

Expectancy \times value conceptualizations have a long historical tradition in self-regulation research (e.g., Atkinson, 1957; Kruglanski et al., 2002; for an overview see Heckhausen & Heckhausen 2008). The value component represents the desirability of particular goals (i.e., why people would engage in an activity) and the expectancy component represents the instrumentality of means for this goal pursuit, that is, the likelihood that the particular goal materializes as a function of the behavior or circumstances in question (i.e., how much the particular activity serves its purpose).

We argue that such an expectancy \times value rationale underlies people’s inference of the degree to which behavior appears as meaningful. Let’s consider the example of *running on a training course*. How do people infer whether or not this behavior is meaningful? Possibly, people who wish to participate in a marathon would consider ‘running on a training course’ as meaningful because it would help them to get closer to the goal to run the marathon. That is, the meaningful behavior is associated with a *personally valued goal* and the behavior is *instrumental* for the pursuit of this goal.

Why would behavior that serves as instrumental means in the pursuit of highly valued goals be associated with appraised meaningfulness? Likely, many goals that people find

highly valued hold the promise of personal growth, self-transcendence, and self-worth, which are important facets of meaning in life (for an overview see Steger et al., 2006). Along the same lines, Kasser and Sheldon (2004) emphasize that people seek to fulfill their “potentials and possibilities” (p. 480). Indeed, the consideration of instrumental goal pursuit as an essential facet of achieving meaningfulness is consistent with past research that relates meaningfulness to purposefulness, personal growth, and self-transcendence (e.g., Ryff & Singer, 1998; Seligman, 2002).

Our approach is consistent with the notion that the expected value of one’s behavior influences people’s motivation to engage in activities (for overviews see Heckhausen & Heckhausen, 2008; Feather, 1982; see also Kruglanski et al., 2002). That is, people are committed to a goal when it is high in value and attainable. However, we focus on a crucial psychological variable within this paradigm: The degree to which behavior is inferred as meaningful. Specifically, we argue that people regard behavior as *meaningful* if it is associated with a valued goal and if it is an instrumental means for the pursuit of the valued goal, that is, whether or not the valued goal is attainable.

Why is This Research Important?

Psychological conceptualizations of meaningfulness have often *implicitly* been linked to self-regulatory processes, but an investigation of how their basic elements can be integrated is restricted to surprisingly few *explicit* articulations. Explicitly integrating the concept of meaningfulness of behavior within a self-regulatory paradigm subscribes to the critical role that meaning-regulation processes plays in the attainment of life satisfaction, happiness, work enjoyment, well-being, and the reduction of depression, anxiety, substance abuse, and many more (e.g., Adler & Fagley, 2005; Bonebright et al., 2000; Chamberlain & Zika, 1988; Debats et al., 1993; Harlow et al., 1986; see also Steger et al, 2006; Heine et al, 2006).

We suggest that the perceived meaningfulness of behavior may explain how and why people respond to particular experiences. Rather than *defining* which specific behaviors are meaningful, we adopted a self-regulatory framework that is integrative with respect to individual and contextual variations. Whether or not a specific goal is important (e.g., highly valued) depends largely on the given individual or contextual characteristics. A specific type of behavior might be meaningful for some people but not for others, and it may be meaningful in one particular situation but not in another—a crucial observation for an appropriate understanding of when and how meaningfulness can be derived from specific behaviors (see also Steger et al., 2006, p. 81). In essence, we argue that inferences of meaningfulness of behavior are subjective and context sensitive.

Contemporary theories in existential psychology, such as the meaning maintenance model (e.g., Heine et al., 2006) and terror management theory (e.g., Greenberg et al., 2004) ascribe a pivotal role to perceptions of meaning in explaining behavioral responses to threats or inconsistencies. In order to make predictions about people's behavior, one thus has to recognize what behavior people perceive as meaningless or meaningful. We pose that our approach provides a basis for specifying the processes of meaning maintenance and meaning re-establishment when people face threats to meaning in their lives (e.g., Van Tilburg & Igou, 2011). Put differently, specifying the basis of inferred meaningfulness of behavior is likely to increase the precision in predicting meaning-regulation processes and behavior. We report five studies that shed light on the inferences of meaningfulness of behavior as a function of goal value and instrumentality of the behavior.

Study 1: People's Evaluation of Meaninglessness of Their Behavior

We first examined whether the evaluation of meaninglessness of behavior varies as a function of the interplay between value of goals and the instrumentality of the means for approaching these goals. Specifically, in this study participants recalled behaviors that would

fall into one of each of the four combinations of our goal value and instrumentality manipulations. We predicted that in comparison to all other conditions, participants would evaluate their own recalled behavior as *least meaningful* when it was associated with a highly valued goal *and* when it was instrumental for the achievement of this goal.

Method

Participants and design. Seventy-eight undergraduate students from Tilburg University ($M_{\text{age}} = 20.55$, $SD = 3.23$; 36 men, 42 women) were randomly assigned to the conditions of a 2 (goal value: high vs. low) \times 2 (instrumentality: high vs. low) factorial design in exchange for course credit.

Procedure and materials. We conducted a pilot study in order to check for the effectiveness of the procedure that we planned to use for the main study.

Pilot study. Thirty-three participants ($M_{\text{age}} = 24.52$, $SD = 9.31$; 13 men, 20 women) were randomly assigned to the same 2 \times 2 factorial design as participants in the main study. We *manipulated goal value* by having participants write down a goal that was of high value to them (high goal value condition) versus a goal that had little value to them (low goal value condition). As manipulation check, we asked participants to rate the value of the goal (“To what extent is this goal valuable to you?”), using a seven-point scale from 1 (*not at all*) to 7 (*very much*). Next, we *manipulated instrumentality of behavior* by instructing participants to describe an activity that helped them to pursue the aforementioned goal (high instrumentality condition) or that did not help them to pursue the goal (low instrumentality condition). As manipulation check, we asked participants to rate the extent to which the behavior was helpful for pursuing the goal (“To what extent was this behavior helpful in the pursuit of this goal?”), using a seven-point scale from 1 (*not at all*) to 7 (*very much*). As expected, in the high goal value condition the value was perceived as higher than in the low goal value condition ($M_{\text{high}} = 6.04$, $SD = 1.52$ vs. $M_{\text{low}} = 2.20$, $SD = 0.92$), $t(31) = 7.38$, $p < .001$, $d =$

2.65. And in the high instrumentality condition behavior was perceived as more instrumental than in the low instrumentality condition ($M_{\text{high}} = 6.12$, $SD = 1.05$ vs. $M_{\text{low}} = 1.80$, $SD = 1.42$), $t(30) = 9.83$, $p < .001$, $d = 3.59$. These results indicate that our procedure indeed triggers the recall of behavior that is high or low in goal value and high or low in instrumentality. Given that this procedure was effective with regard to the generation of behaviors that fall into the goal value (high vs. low) \times instrumentality (high vs. low) combinations, we included it in our main study.

In the main study, participants were seated in cubicles and were given the paper & pencil materials. After participants gave informed consent forms and reported demographic information, we manipulated goal value and instrumentality of behavior as in the pilot study (examples of behaviors that participants listed are provide in Table 1). Afterwards, we assessed the perceived goal value as done in the pilot study and, importantly, also the *perceived meaninglessness of behavior* by having participants rate the extent to which they considered their recalled behavior as meaningless on five items “To what extent did you experience this activity as meaningless?”, “To what extent did you experience this activity as senseless?” “To what extent did you experience this activity as purposeless?”, “To what extent did you experience this activity as insignificant?”, and “To what extent did you experience this activity as worthless?” on scales from 1 (*not at all*) to 7 (*very much*).¹ Afterwards, participants were thanked and debriefed.

Results and Discussion²

Goal value. A t-test with the manipulated goal value as independent and the rated goal value as dependent variable confirmed that the high goal value condition yielded higher goal value ratings ($M = 6.38$, $SD = 0.75$) compared to the low goal value condition ($M = 1.90$, $SD = 1.12$), $t(76) = 20.82$, $p < .001$, $d = 4.78$.

Meaninglessness. We computed a meaninglessness score based on the five items that served as dependent variables ($\alpha = .91$) and entered it into a two-way ANOVA with goal value and instrumentality as independent variables. High goal value led to lower levels of perceived meaninglessness of behavior than low goal value ($M = 2.28$, $SD = 1.41$ vs. $M = 2.97$, $SD = 1.34$), $F(1, 74) = 5.85$, $p = .02$, $\eta^2 = .07$, and high instrumentality of behavior led to lower meaninglessness ratings than low instrumentality ($M = 2.35$, $SD = 1.41$ vs. $M = 2.95$, $SD = 1.37$), $F(1, 74) = 5.50$, $p = .02$, $\eta^2 = .07$.³

Importantly, these main effects were qualified by the predicted interaction of goal value and instrumentality, $F(1, 74) = 13.60$, $p < .001$, $\eta^2 = .16$. As reflected in Figure 1, participants rated their behavior as less meaningless when the behavior was highly instrumental for the pursuit of a highly valued goal ($M = 1.40$, $SD = .57$), compared to when instrumentality was low, ($M = 3.11$, $SD = 1.47$), $t(74) = 4.30$, $p < .001$, $d = 1.00$, compared to when the behavior was highly instrumental for a less valued goal, ($M = 3.13$, $SD = 1.41$), $t(74) = 4.50$, $p < .001$, $d = 1.05$, and compared to behavior that was low in instrumentality for a less valued goal ($M = 2.75$, $SD = 1.25$), $t(74) = 3.21$, $p < .01$, $d = 0.75$. We did not observe any significant differences in perceived meaninglessness of behavior whenever the goal had low value and/or the instrumentality of behavior was low (all t s < 1). Overall, these results demonstrate that people perceive behavior to be least meaningless (i.e., most meaningful) when it serves a valued goal, whereas behavior is perceived to be relatively meaningless when it does not serve a valued goal or when it serves a less valued goal.

Study 2: Meaningfulness Conditional on Means-Goals Relationships

Study 2 was also designed to test the effects of goal value and instrumentality on perceived meaningfulness of behavior. However, in contrast to Study 1, this study tested the effect of means-goals variations on perceived meaningfulness of the *same* behavior (i.e., keeping the behavior constant). The assumption of this study was that meaningfulness is not

inherent to a specific type of behavior. Instead, meaningfulness of behavior is defined in relation to goals that people value and the perceived instrumentality of the behavior for these goals. Therefore, different effects can be expected for one and the same behavior when means-goals relations change.

Participants evaluated the target behavior ('running along the forest's training course for a very long time') either when the goal was highly valued or had little value. We also varied whether this behavior was instrumental for the goal or not instrumental for the goal. We predicted that the same behavior would be considered more meaningful when it was instrumental for the pursuit of a valued goal compared to when the goal did not have much value and/or when the behavior was not instrumental for the goal pursuit.

Method

Participants and design. Forty-four undergraduate students at the University of Limerick were randomly assigned to the conditions of a 2 (goal value: high vs. low) \times 2 (instrumentality: high vs. low) \times 2 (order of goal value: high/low vs. low/high) mixed design with goal value as within-participants factor and with instrumentality and order of goal value as between-subjects factors. One participant was an extreme outlier and excluded from the analysis (see Tabachnick & Fidell, 2007), resulting in an effective sample size of forty-three participants ($M_{\text{age}} = 23.53$, $SD = 3.68$; 25 men, 19 women).⁴

Procedure and materials. Participants in the campus library gave their informed consent and reported demographic information. Participants were then instructed to read two scenarios. We asked them to imagine that they woke up early, went to the forest, and started *running along the forest's training course for a very long time*. We manipulated goal value and instrumentality by altering the content of this scenario. Specifically, we stated in the high instrumentality condition that they performed this behavior to qualify for the New York City Marathon, whereas in the low instrumentality condition we stated that they tried to qualify for

the New York City Chess Competition. In the high goal value condition we added that this goal was of great value to him, whereas in the low goal value condition we added that this goal was of very little value to him.

We asked participants to respond to several questions. First, we checked for the effectiveness of our manipulation by asking participants to rate the items “To what extent do you consider Frank’s goal to be valuable?” and “To what extent do you consider his behavior as a helpful way to pursue this goal?” on scales from 1 (*not at all*) to 7 (*very much*). The scenarios’ instrumentality ratings were highly correlated ($r = .69, p < .001$) and therefore averaged. Next, participants rated to what extent they would consider the behavior as meaningful and meaningless on two items that read “To what extent do you consider Frank’s behaviour to be meaningful?” and “To what extent do you consider Frank’s behaviour to be meaningless?”, rated on seven-point scales ranging from 1 (*not at all*) to 7 (*very much*). Scores on the rated meaningfulness and meaninglessness items were significantly correlated for the high and low goal value scenarios ($r = -.80, p < .001$ and $r = -.86, p < .001$, respectively) and therefore combined into *two* composite measures (after recoding the meaninglessness items). Participants were thanked and debriefed after completing the study.

Results and Discussion

Preliminary analysis did not reveal any reliable main effects of the order of goal value nor any interactions with the other independent variables (on manipulation checks all $ps > .59$; all $ps > .14$ for value and instrumentality, respectively; on meaningfulness of the behavior all $ps > .52$). This variable was therefore excluded from subsequent analyses.

Manipulation checks. A t-test with instrumentality as independent variable and the composite instrumentality ratings as dependent variable confirmed that participants in the high instrumentality condition regarded the behavior as more instrumental ($M = 5.48, SD = 1.34$) than participants in the low instrumentality condition ($M = 2.89, SD = 1.49$), $t(41) =$

5.98, $p < .001$, $d = 1.71$. A paired sample t-test between participants' goal value ratings of the high goal value condition and participants' value ratings the low goal value condition similarly revealed that participants thought that the highly valued goal was more valued ($M = 4.77$, $SD = 2.02$) than the little valued goal ($M = 3.40$, $SD = 2.17$), $t(42) = 5.41$, $p < .001$, $d = 1.67$.

Meaningfulness of behavior. A one-way ANOVA for repeated measures with instrumentality as between-subjects factor, goal value as within-participants factor, and the composite measures of meaningfulness as repeated measure variable was performed. We observed a marginally significant influence of the instrumentality manipulation, $F(1, 41) = 3.70$, $p = .06$, $\eta^2 = .08$. Specifically, participants in the high instrumentality condition regarded the behavior as more meaningful ($M = 4.89$, $SD = 0.99$) compared to participants in the low instrumentality condition ($M = 4.02$, $SD = 1.79$). In addition, participants indicated a significantly higher level of meaningfulness of the behavior when it was associated with high goal value ($M = 4.77$, $SD = 1.97$) than when it was associated with low goal value ($M = 4.08$, $SD = 1.96$), $F(1, 41) = 4.89$, $p = .03$, $\eta^2 = .11$. Importantly, however, the main effects were qualified by the predicted interaction of goal value and instrumentality, $F(1, 41) = 10.36$, $p < .01$, $\eta^2 = .20$. As reflected in Figure 2, perceived meaningfulness was highest when the behavior was associated with a goal that was high in value *and* when the behavior was high in instrumentality ($M = 5.83$, $SD = 1.25$), compared to when the instrumentality of behavior was low for a low value goal ($M = 4.20$, $SD = 2.05$), $t(41) = 3.09$, $p < .01$, $d = 0.97$, compared to when the behavior was highly instrumental for a low value goal ($M = 3.95$, $SD = 1.90$), $t(19) = 3.31$, $p < .01$, $d = 1.52$, and compared to when the behavior was low in instrumentality for a high value goal ($M = 3.85$, $SD = 2.04$), $t(41) = 3.76$, $p < .001$, $d = 1.17$. No significant differences were observed between the three conditions where either instrumentality was low, goal value was low, or both were low (all $ps > .31$). These results demonstrate that, as

predicted, the same specific behavior was only considered relatively meaningful when it was regarded as instrumental for a highly valued goal.

Study 3: Relationship to a Superordinate Goal as Source of Meaningfulness

Studies 1 and 2 demonstrate that perceived meaningfulness of behavior is embedded in its instrumentality to serve a valued goal. Similar to Study 2, we tested perceived meaningfulness for the same behavior as a function of goal value and instrumentality. However, in contrast to Study 2 we presented a superordinate goal from which the goal value would be derived (e.g., Kruglanski et al., 2002). We predicted that the target behavior would be perceived as more meaningful when it was associated with a superordinate goal and instrumental for the goal pursuit compared to when either the superordinate goal was absent or when instrumentality was low.

Method

Participants and design. Ninety-five people in Limerick's city centre were randomly assigned to the conditions of a 2 (goal value: high vs. low) \times 2 (instrumentality: high vs. low) factorial design in exchange for a beverage at a local café. Two participants were excluded from the analysis after being identified as extreme outliers (see Tabachnick & Fidell, 2007), resulting in an effective sample size of ninety-three participants ($M_{\text{age}} = 27.29$, $SD = 12.71$; 36 men, 59 women).

Procedure and materials. Participants were seated at a café and were given the materials. Participants gave their informed consent, reported demographic information, and we instructed participants to read a scenario about Frank and his behavior (similar to Study 2). In the high instrumentality condition it was stated that Frank performed this behavior in order to qualify for the New York City Marathon, whereas in the low instrumentality condition we stated that Frank tried to qualify for the New York City Chess Competition. In the high goal value condition we added that Frank wanted to qualify for the event as he

would perceive the achievement of this goal as an “act of his victory over cancer.” We assumed that the superordinate goal (symbolic victory of cancer) would indirectly lend value to the focal goal (qualifying for a competition in New York City). In the low goal value condition we did not refer to a superordinate goal.

We checked for the effectiveness of our manipulation by asking participants to indicate to what extent Frank’s goal was highly valued and to what extent Frank’s behavior was helpful for pursuing this goal with items that were identical to Study 2. Next, participants rated to what extent they considered the behavior as meaningful and meaningless as done in Study 2. Scores on the rated meaningfulness and meaninglessness items ($r = -.66, p < .001$) were combined into a composite measure (after recoding the meaninglessness item). Participants were thanked and debriefed at completion of the study.

Results and Discussion

Manipulation checks. A t-test with instrumentality as independent variable and instrumentality ratings as dependent variable confirmed that participants in the high instrumentality condition regarded Frank’s behavior as more instrumental ($M = 3.87, SD = 1.95$) than participants in the low instrumentality condition ($M = 2.85, SD = 1.98$), $t(89) = 2.48, p = .02, d = 0.53$. A t-test with the goal value as independent variable and goal value ratings as dependent variable revealed that participants in the high goal value condition regarded Frank’s goal as more valued ($M = 5.51, SD = 1.56$) than participants in the low goal value condition ($M = 4.19, SD = 1.98$), $t(88) = 3.54, p < .001, d = 0.75$.

Meaningfulness of behavior. A two-way ANOVA with goal value and instrumentality as independent variables, and the composite measure of meaningfulness revealed no reliable main effect of the goal value manipulation, $F(1, 87) = 2.09, p = .15, \eta^2 = .02$, but we did observe a main effect for instrumentality, $F(1, 87) = 5.11, p = .03, \eta^2 = .06$. Specifically, participants indicated a higher level of meaningfulness of the behavior when it

was instrumental ($M = 4.77$, $SD = 1.80$) than when it was not instrumental ($M = 3.91$, $SD = 1.81$). Importantly, however, the main effect was qualified by the predicted interaction between goal value and instrumentality, $F(1, 87) = 4.06$, $p = .05$, $\eta^2 = .05$. As reflected in Figure 3, perceived meaningfulness was highest when the behavior was associated with a highly valued goal *and* when the behavior was high in instrumentality ($M = 5.39$, $SD = 1.65$), compared to when instrumentality was low for the high value goal ($M = 3.81$, $SD = 1.82$), $t(87) = 3.07$, $p < .01$, $d = 0.66$, compared to when the behavior was high in instrumentality for a relatively low value goal ($M = 4.11$, $SD = 1.74$), $t(87) = 2.43$, $p = .02$, $d = 0.52$, and compared to when both the Goal Value and Instrumentality were relatively low ($M = 4.02$, $SD = 1.82$), $t(87) = 2.61$, $p = .01$, $d = 0.56$. No significant differences were observed between the three conditions where either instrumentality was low or the goal value was relatively low (all $ps > .56$). This means that, as predicted, the same specific behavior was only considered relatively meaningful when it was regarded as instrumental for a highly valued goal.

Behavior was perceived as especially meaningful when it was instrumental to pursue a valued goal. However, in contrast to Study 2, we did not ask participants to view the presented goal (qualifying for a competition) as highly valued or not, instead, more implicitly, we either associated this goal with a superordinate goal or we did not associate it with a superordinate goal. As predicted, participants derived the meaningfulness of behavior from its functional relationship with the value-laden superordinate goal.

Study 4: High Versus Moderate Versus Low Instrumentality

Studies 2 and 3 indicate that behavior is perceived as especially meaningful when it is instrumental in the pursuit of a valued goal. In Study 4 we included a more moderate level of instrumentality in order to demonstrate the validity of our hypothesis across various levels of instrumentality. Specifically, in addition to assessing the perceived meaningfulness of running on the forest's training course for a very long time as strategy to qualify for a

marathon (high instrumentality) or chess competition (low instrumentality), we added a condition in which the behavior was a means to qualify for a horseback racing competition. For this type of sport activity, being a 'fit' by running is helpful but less instrumental than for running a marathon, however, the physical fitness is more instrumental for the horseback than for the chess competition. Hence, the horseback racing competition served as a more moderate instrumentality condition.

Method

Participants and design. Two-hundred-and thirty-three students from the University of Limerick were randomly assigned to the conditions of a 2 (goal value: high vs. low) \times 3 (instrumentality: high vs. moderate vs. low) factorial design. Two participants were excluded from the analysis after being identified as extreme outliers (see Tabachnick & Fidell, 2007), resulting in an effective sample size of two-hundred-and thirty-two participants ($M_{\text{age}} = 22.04$, $SD = 5.72$; 119 men, 108 women).

Procedure and materials. Participants were approached in study areas of the University of Limerick. After giving informed consent, they reported demographic information and read a scenario about Frank and his behavior, as in Study 2 and 3. In the high instrumentality condition it was stated that Frank performed this behavior in order to qualify for the New York City Marathon; in the moderate instrumentality condition it was stated that Frank tried to qualify for the New York Horseback Racing Competition; in the low instrumentality condition it was stated that Frank tried to qualify for the New York Chess Competition. Similar to Study 2, we mentioned in the high goal value condition that this goal was of great value and mentioned in the low goal value condition that this goal was of little value.

We checked for the effectiveness of our manipulation by asking participants to indicate to what extent Frank's goal was valued and to what extent Frank's behavior was

helpful for pursuing this goal with identical items as in Study 2 and 3. Next, participants rated the extent to which they considered the behavior as meaningful and meaningless (see Study 2 and 3). Participants were thanked and debriefed upon completion of the study.

Results and Discussion

Manipulation checks. An ANOVA with instrumentality as independent variable and instrumentality ratings as dependent variable indicated significant differences between the conditions, $F(2, 228) = 25.23, p < .001, \eta^2 = .18$. Participants in the high instrumentality condition regarded Frank's behavior as more instrumental ($M = 5.32, SD = 1.73$) than participants in the moderate instrumentality condition ($M = 4.03, SD = 2.19$), $t(228) = 3.83, p < .001, d = 0.51$, and compared to the low instrumentality condition ($M = 2.91, SD = 2.25$), $t(228) = 7.10, p < .001, d = 0.94$. Also the difference between the low and moderate instrumentality conditions was reliable, $t(228) = 3.37, p < .001, d = 0.45$. A t-test with the goal value as independent variable and goal value ratings as dependent variable revealed that participants in the high goal value condition regarded Frank's goal as more valued ($M = 5.12, SD = 1.93$) than participants in the low goal value condition ($M = 3.29, SD = 2.04$), $t(229) = 7.00, p < .001, d = 0.93$.

Meaningfulness of behavior. Scores on the rated meaningfulness and meaninglessness items ($r = -.75, p < .001$) were combined into a composite measure (after recoding the meaninglessness item) and then entered as dependent variable into a two-way ANOVA with goal value and instrumentality as independent variables. As reflected in Figure 4, a reliable main effect of the goal value manipulation, $F(1, 225) = 30.79, p < .001, \eta^2 = .12$, and a significant main effect of instrumentality, $F(2, 225) = 6.50, p < .01, \eta^2 = .04$ were observed. Importantly, however, the main effects were qualified by the predicted interaction between goal value and instrumentality, $F(2, 225) = 4.81, p < .01, \eta^2 = .04$. When instrumentality was low, the behavior did not reliably differ in perceived meaningfulness

between the low and high goal value conditions ($M = 3.55$, $SD = 1.93$ vs. $M = 4.01$, $SD = 2.25$), $t(225) = 1.15$, $p = .25$, $d = 0.15$. In the moderate instrumentality condition, however, this difference was significant ($M = 3.58$, $SD = 1.95$ vs. $M = 4.76$, $SD = 1.72$), $t(225) = 2.98$, $p < .01$, $d = 0.40$, as was the case in the high instrumentality condition, ($M = 3.70$, $SD = 1.57$ vs. $M = 5.96$, $SD = 0.91$), $t(225) = 5.41$, $p < .001$, $d = 0.72$. Moreover, none of the instrumentality conditions significantly differed when goal value was low (all $ts < 1$). When goal value was high, however, then the high instrumentality condition yielded significantly higher perceived meaningfulness ratings compared to the low instrumentality condition, $t(225) = 4.69$, $p < .001$, $d = 0.63$, and marginally significantly higher compared to the moderate instrumentality condition, $t(225) = 1.86$, $p = .07$, $d = 0.25$. In addition, a significant difference was observed between moderate and low instrumentality for participants in the high goal value condition, $t(225) = 2.92$, $p < .01$, $d = 0.39$. As predicted, these results reflect that behavior is appraised as more meaningful the more it is regarded as instrumental for a highly valued goal. These results converge with those from the previous studies in which the combination of high instrumentality and high goal value consistently led to significantly higher meaningfulness scores than all other combinations of instrumentality and goal value (all $ps < .05$).

Consistent with the results of the previous studies, and in particular Study 2 and 3, the results of Study 4 confirmed that the appraised meaningfulness of behavior is a function of the interaction between instrumentality and goal value. Extending Studies 2 and 3, the current study included an additional condition of moderate instrumentality, providing support for the notion that meaningfulness of behavior is inferred from the levels of instrumentality for the behavior with regard to the (high vs. low) value that the goal of the behavior has.

Study 5: The Meaningfulness of Common Behaviors

Study 5 was designed to test for the robustness of the previously observed effects by using a very different procedure. We focused on *common behaviors* and used a *subtle manipulation of the instrumentality* of the behaviors by varying the instrumentality of specific behaviors between participants. In two pilot studies we assessed the goal value and the associated instrumentality of four behaviors. This was followed by the main study in which we manipulated the instrumentality of the behaviors with low goal value (watching television and reading comics) and the instrumentality of behaviors with high goal value (traveling and donating money to charity), and we then assessed the perceived meaningfulness of these behaviors.

Method

Pilot Study I: Goal value of behaviors. We first assessed the goal value of four behaviors: watching television, traveling the world, reading comics, and donating to Amnesty International. Thirty-one students from the University of Limerick ($M_{\text{age}} = 21.48$, $SD = 2.83$; 14 men, 17 women) who received candy as reward indicated for each behavior to which extent it served a highly valued goal, using the item “To what extent does the following action serve a valuable goal?”, followed by each specific behaviors and rated on five-point interval scales from 1 (*not at all*) to 5 (*very much*). Afterwards, participants were thanked, debriefed, and rewarded.

A series of paired sample t-tests indicated that the goal value associated with watching television ($M = 1.74$, $SD = 0.96$) was significantly lower than the goal value associated with traveling the world ($M = 4.19$, $SD = 0.91$), $t(30) = 9.05$, $p < .001$, $d = 3.30$, and donating money to Amnesty International ($M = 3.71$, $SD = 0.97$), $t(30) = 7.14$, $p < .001$, $d = 2.61$, but it did not significantly differ from the goal value of reading comics ($M = 1.84$, $SD = 0.78$; $t < 1$). In addition, the associated goal value of reading comics was significantly lower

than that of traveling the world, $t(30) = 10.69, p < .001, d = 3.90$, and donating money to Amnesty International, $t(30) = 8.46, p < .001, d = 3.09$. We also observed that the goal associated with traveling the world was significantly more valued compared to the goal value of donating money, $t(30) = 2.18, p = .04, d = 0.80$. Overall, the results suggest that participants considered the activities of watching television and reading comics to be associated with less valued goals than traveling the world and donating to Amnesty International.

Pilot Study II: Instrumentality of behaviors. Twenty-one students from the University of Limerick ($M_{\text{age}} = 25.67, SD = 9.20$; 10 men, 11 women) participated in a short internet survey (SurveyMonkey) and were asked to list a goal that they considered to be served by each behavior: watching television (goals were listed such as “entertainment” and “relaxation”), traveling to see the world (goals were listed such as “adventure” and “cultural knowledge”), donating money to Amnesty International (goals were listed such as “helping others” and “alleviating suffering”), and reading comics (goals were listed such as “amusement” and “having a laugh”). Asking participants to list goals was done in order to facilitate the assessment of the behaviors’ instrumentality. Next, participants evaluated the extent to which the behaviors of watching television for *one* hour (low instrumentality), watching television for *two* hours (high instrumentality), traveling to see the world for 2 *weeks* (low instrumentality), traveling to see the world for 2 *months* (high instrumentality), donating € 50.- to Amnesty International (low instrumentality), donating € 100.- to Amnesty international (high instrumentality), reading *one* comic album (low instrumentality), and reading *two* comic albums (high instrumentality) were instrumental for the behaviors’ goals listed earlier. This was done using the item “Please indicate the extent to which you think that the below activities are helpful for achieving the goal you listed above”, followed by each of

the behaviors and rated on five-point interval scales ranging from 1 (*not at all*) to 5 (*very much*). Afterwards, participants were thanked and debriefed.

A series of paired sample t-tests showed that watching television for two hours ($M = 3.10$, $SD = 1.11$) was considered to be more instrumental for the associated goal than watching one hour ($M = 2.75$, $SD = 1.16$), $t(19) = 2.67$, $p = .02$, $d = 1.23$. Traveling the world was perceived to be more instrumental when it lasted two months ($M = 4.10$, $SD = 1.00$) compared to two weeks ($M = 2.57$, $SD = 1.36$), $t(20) = 6.78$, $p < .001$, $d = 3.03$. Donating €100.- to Amnesty International was considered to be more instrumental ($M = 3.80$, $SD = 0.89$) compared to donating € 50.- ($M = 3.45$, $SD = 0.95$), $t(19) = 2.33$, $p = .03$, $d = 1.07$. And reading two comic albums was considered to be more instrumental ($M = 3.00$, $SD = 1.30$) than reading one comic album ($M = 2.76$, $SD = 1.14$), $t(20) = 2.50$, $p = .02$, $d = 1.12$. The results of the second pilot study thus showed that small changes to all behaviors influenced the level to which they were perceived as instrumental.

In sum, the pilot studies identified two behaviors that were associated with a little valued goal and two behaviors associated with a highly valued goal, and we could identify how to manipulate different levels of instrumentality for all four behaviors. As a next step, we tested whether meaningfulness increased as a function of goal value and instrumentality. We predicted that behavior would be considered to be most meaningful when it was both associated with a highly valued goal and instrumental for the achievement of this goal. Importantly, we varied instrumentality of each specific behavior in a between subjects design and did not make any explicit reference to goal value or instrumentality.

Participants and design. Ninety students from the University of Limerick were randomly assigned to either one of two between-subjects conditions of behavior examples (group A vs. group B). One participant was an extreme outlier and thus excluded from the analysis (see Tabachnick & Fidell, 2007), resulting in an effective sample size of eighty-nine

participants ($M_{\text{age}} = 20.62$, $SD = 3.95$; 40 men, 50 women). Participants in *both* groups evaluated the two behaviors high in instrumentality and the two behaviors low in instrumentality, but the groups differed regarding the *specific* behaviors that were high or low in instrumentality (see procedure and Table 2). This variation was included in order to avoid that participants would evaluate the same behavior multiple times.

Materials and procedure. After participants gave their informed consent and reported demographic information, we asked them to evaluate the extent to which they considered the four behaviors from the pilot studies (watching television, traveling the world, reading comics, and donating money to Amnesty International) to be meaningful and meaningless with the items “To what extent do you consider the following actions to be meaningful?” and “To what extent do you consider the following actions to be meaningless?”, each followed by the target behaviors and rated on five-point interval scales from 1 (*not at all*) to 5 (*very much*). Averaged recoded meaningfulness scores were computed for each activity ($.67 > rs > .83$, all $ps < .001$).

Based on the pilot studies we used two high goal value behaviors (e.g., donating to Amnesty International) and two low goal value (e.g., watching television) behaviors and varied their instrumentality (e.g., €50 vs. €100 and one vs. two hours, resp.). As reflected in Table 2, half of the participants (group A) evaluated watching television for *one* hour (low goal value, low instrumentality), reading *two* comic albums (low goal value, high instrumentality), travelling to see the world for *2 weeks* (high goal value, low instrumentality), and donating €100.- to Amnesty International (high goal value, high instrumentality). The rest of the participants (group B) evaluated watching television for *two* hours (low goal value, high instrumentality), reading *one* comic album (low goal value, low instrumentality), traveling the world for *2 months* (high goal value, high instrumentality), and donating €50.- to Amnesty International (high goal value, low instrumentality). In essence,

we varied between participants (group A vs. group B) the concrete form of each behavior example so that in each group (A and B) these behaviors would represent conditions of a 2 (goal value: high vs. low) \times 2 (instrumentality: high vs. low) within-participants design. This way, each participant evaluated overall four concrete behaviors with regard to their meaningfulness and meaninglessness. Afterwards, participants were thanked, debriefed, and rewarded.

Results

Meaningfulness scores were computed for each of the four goal value \times instrumentality combinations. For example, the perceived meaningfulness of *high goal value, high instrumentality* behavior reflected the evaluations of *donating* for those in group A and comprised on travelling evaluations for those in group B.⁵ These meaningfulness scores were entered as dependent variable into a within-factorial ANOVA with two factors: goal value was entered as first within-subjects factor, and the instrumentality of the different behaviors was entered as second within-subjects factor. An overview of the meaningfulness averages is depicted in Figure 5.

First of all, a significant difference was found between the low and high goal value behaviors, $F(1,88) = 230.95$, $p < .001$, $\eta^2 = .72$, indicating that the high goal value behaviors were seen as generally more meaningful ($M = 4.34$, $SD = 0.60$) compared to the low goal value behaviors ($M = 2.62$, $SD = 0.95$). No significant main effect of instrumentality emerged, $F(1,88) = 2.53$, $p = .12$, $\eta^2 = .03$. Importantly, the predicted significant goal value \times instrumentality interaction was observed, $F(1,88) = 5.96$, $p = .02$, $\eta^2 = .06$, suggesting that the effect of goal value on the meaningfulness of behavior was dependent on the behaviors' level of instrumentality. Specifically, in the high goal value, high instrumentality condition participants evaluated behavior as more meaningful ($M = 4.53$, $SD = 0.66$) compared to the high goal value, low instrumentality condition ($M = 4.16$, $SD = 0.98$), $t(88) = 3.00$, $p < .01$, d

= 0.64, but also compared to the low goal value, high instrumentality condition ($M = 2.59$, $SD = 1.13$), $t(88) = 14.61$, $p < .001$, $d = 3.11$, and the low goal value, low instrumentality condition (2.64 , $SD = 1.18$), $t(88) = 13.78$, $p < .001$, $d = 2.94$). The perceived meaningfulness of low goal value behavior did not differ between the high instrumentality ($M = 2.59$, $SD = 1.13$) and the low instrumentality condition ($M = 2.64$, $SD = 1.18$; $t < 1$).

The above main analysis attests that common behavior high in instrumentality when associated with a high value goal-value is deemed particularly meaningful, which is fully consistent with the results of our previous studies. To complement these main findings we additionally examined the effects of our instrumentality manipulation on the specific two low goal-value and high goal-value behaviors. Indeed, travelling was perceived as more meaningful under high instrumentality ($M = 4.50$, $SD = 0.67$) versus low instrumentality ($M = 4.07$, $SD = 1.13$), $F(1,87) = 4.85$, $p = .03$, $\eta^2 = .05$. The same was true for donating, which was appraised as more meaningful when it was highly instrumental ($M = 4.55$, $SD = 0.66$) compared to when it was low in instrumentality ($M = 4.24$, $SD = 0.82$), $F(1,87) = 4.06$, $p = .05$, $\eta^2 = .05$. Fully consistent with the previous studies, no effect of instrumentality emerged for the low goal value behaviors of watching television and reading comics ($F_s < 1$). Overall, these results hence provide converging evidence of the predicted effects.

Discussion

The present study revealed that people ascribe highest levels of meaningfulness to behaviors that are instrumental in serving a highly valued goal. Less meaningfulness is perceived if the instrumentality of behavior in serving high valued goals drops. And relatively little meaningfulness is ascribed to behaviors that do not serve a highly valued goal, independent of whether or not behaviors are instrumental for the associated goal.

In this study, we investigated relatively *common* behaviors and varied their instrumentality in a subtle way. In addition, we assessed the behaviors' associated goal value,

instrumentality, and meaningfulness in separate empirical steps, ensuring that participants did not base meaningfulness ratings on explicit references to goal value and instrumentality.

Taken together, our results show that people's existential perceptions of behavior (i.e. the behaviors' meaningfulness) are based on the goals that people have and whether or not the available courses of actions serve highly valued goals.

General Discussion

What makes behavior 'meaningful'? How can 'meaning' be understood from a self-regulatory perspective? We adopted an expectancy \times value approach to examine people's perceptions of the extent to which behavior is meaningful. We proposed and found that people view those behaviors as meaningful that are useful for achieving highly valued goals. Behaviors that are unrelated to valued goals or not instrumental for their pursuit are likely to be considered as relatively meaningless. Five studies tested and confirmed the validity of this conceptualization of meaningful versus meaningless behavior. Throughout these studies, the associated goal value and the instrumentality of behaviors were independently manipulated in order to systematically test the hypothesis that the *interaction* between these two components (expectancy and value) is associated with appraising the behavior as relatively meaningful or meaningless.

In Study 1 we asked people to evaluate behaviors that differed in goal value and instrumentality. Results confirmed that those behaviors that were both high in instrumentality and associated with a valued goal, were considered least meaningless. In Study 2 we asked all participants to evaluate the same behavior and found that the behavior was considered to be especially meaningful when it was instrumental for achieving a highly valued goal. In Study 3 we used a superordinate goal form which goal value could be derived. As predicted, we also observed the goal value \times instrumentality interaction. In Study 4 we added a moderate instrumentality condition and again observed the predicted goal value \times instrumentality

interaction. Finally, we tested in Study 5 whether four relatively common behaviors were perceived as meaningful depending on their associated goal value and manipulated instrumentality. The results confirmed our prediction that behavior would be considered as meaningful when it was instrumental for the pursuit of a highly valued goal. Importantly, in this study we assessed goal value, instrumentality, and meaningfulness in separate empirical steps, ruling out the possibility that the presence of any information about goal value of instrumentality might affect subsequent interpretations of meaningfulness.

Our central dependent variables were perceived *meaningfulness*, reversed perceived *meaninglessness*, or a combination of both throughout the studies. One could wonder whether these two concepts are truly each other's opposites. In our own research, meaningfulness and meaninglessness were highly negatively correlated ($-.66 \leq rs \leq -.86$). Note also that past research has treated these concepts as opposites. For example, the presence of meaninglessness subsequently promotes meaningfulness (e.g., Heine et al., 2006) and cues that remind people of life's meaninglessness promote the defense of meaningful worldviews (e.g., Greenberg et al., 2004). In addition, the assessment of meaning in life is commonly achieved by using a scale that is comprised of items that assess meaningfulness and meaninglessness (Steger et al., 2006).

Implications

It is important to be precise about the implications of this research. To our knowledge, the psychological perception of 'meaningfulness' has thus far only been implied to be related to expectancies and values, but we made this assumption *explicit* and provide the necessary *empirical* support. To be clear, although we use the term 'expectancy \times value' as a general characterization of our approach, we certainly subscribe to the notion of *subjective* perceptions of both the expectancy and the value components (*subjective expected utility*; e.g., Edwards, 1954). Nevertheless, by considering both components and their relationship

when assessing behavior, people seem to define meaningfulness in quasi ‘rational’, utilitarian terms, however imperfect these assessments may be. Importantly, the meaningfulness of behavior cannot be equated with either goal value or instrumentality, but rather reflects an evaluation of motivated behavior that follows from the *interaction* between the two. This observation is crucial as it highlights that ‘meaningfulness’ is used by people as a distinct quality that is not simply interchangeable with goal value or instrumentality.

Relationship to psychological research on meaning-regulation. Past research and theorizing has often conceptualized ‘meaning’ as ‘relation’ (e.g., Heine et al., 2006) or as “shared mental representation of possible relationships among things, events, and relationships” (Baumeister, 1992, p.15). Consistent with Kasser and Sheldon’s (2004) notion that meaningfulness is a function of people’s goals and motivations, we proposed that people’s appraisals of the meaningfulness of behavior is well explained by a teleological, goal-based model, such as our expectancy \times value approach. Our novel perspective allows for more precise procedures to induce and measure people’s sense of meaningfulness: Perceived meaningfulness is not simply equal to goal value or instrumentality, our systematic manipulation of both expectancy \times value components demonstrate that perceived meaningfulness has its own quality. It is a central psychological experience in people’s everyday life and it is central in people’s language.

Consistent with the notion that meaning perceptions can greatly vary across individuals (Steger et al., 2006), we did not restrict meaningfulness to only a certain type of behavior in our self-regulatory framework. Rather, depending on the *individual or group* performing the behavior and the *context* in which behavior takes place, perceived meaningfulness of behavior may vary. To give an example, the behavior of bathing in the river Ganges may be considered as much more meaningful by a Hindu than by a Christian. And parents may find it much more meaningful when their child walks for the first time in

life rather than when the child is fully grown. In addition, we approached meaningfulness of behavior as something inherently determined by people themselves, which provides straightforward insights into the causes, processes, and effects that accompany people's experience of meaningful behavior and how they attain a sense of meaning in life. This flexible operationalization facilitates the design of research that investigates the mediating role of the perceived meaningfulness of behaviors.

Past research on meaning-regulation has identified that mortality salience, referring to a situation in which people are reminded of their inevitable death, presents a 'threat' to meaning (Greenberg et al., 2004). *Why* does mortality salience threaten meaning? What element of mortality salience constitutes the meaning threat? Is mortality inconsistent with how we view the world (related to the epistemic meaning concept), or does mortality makes our goals seems insignificant (related to teleological meaning and our expectancy \times value approach)? Similarly, what constitutes other existential threats, such as ostracism (Case & Williams, 2004; Williams, 2002), uncertainty (Van den Bos, 2001), and boredom (Van Tilburg & Igou, 2012)? Do these meaning threats distort our understanding of the world (epistemic meaning), or do they signal an inability to achieve a highly valued goal (expectancy \times value approach to meaning)? We empirically confirmed that meaningfulness is an evaluative term stemming from the interaction between goal value and instrumentality. Consequently, a future direction of our research is to test whether meaning threats affect the subjective instrumentality or goal value of people's actions. Importantly, by specifying 'meaning' as an interaction of self-regulatory terms we provide an important step in pointing out the psychological variable that is likely to mediate the effects of mortality salience, ostracism, uncertainty, and boredom.

In addition, our expectancy \times value approach to meaning may complement epistemic understandings of meaning sources, such as cultural worldviews. For example, the belief in a

God (e.g., Norenzayan & Hansen, 2006), donating charity to those more unfortunate in life (Jonas, Schimel, Greenberg, & Pyszczynski, 2002; Van Tilburg & Igou, 2011c), and the punishment of prostitutes (e.g., Arndt, Lieberman, Cook, & Solomon, 2005), are each considered meaningful within their specific cultural context, presumably because they bolster cultural worldviews that offer a meaningful understanding of life (epistemic meaning). Yet one central feature is that these ‘meaningful’ behaviors are also likely to facilitate valued goal pursuit. To illustrate, among the religious, practicing religious rites may be considered helpful for securing a pleasant afterlife, helping others may be appraised as a strategy to aid the suffering, and retaliating against prostitutes may appear effective for protecting certain moral fabrics of society. Essentially, all of these behaviors are *instrumental* for the pursuit of *highly valued goals* that are held by those individuals or groups. Thus, besides offering opportunities to bolster cultural worldviews (epistemic meaning), such behaviors may additionally serve as sources of meaning from a teleological perspective. Both approaches hence provide useful tools for understanding the meaning concept from different *angles* and they may together draw an integrated picture of the meaning concept as a whole (see also Baumeister, 1992, pp.15-27).

How does our expectancy \times value approach to meaning relate to the appraised meaning of other phenomena, such as experiences, ideas, or life? Speculatively, one would need to identify whether and what purpose these phenomena serve, and this would subsequently lead people to assign meaningfulness to them or not, similar to behavior. For example, an idea such as the belief in the scientific method may become meaningful when such an idea is perceived as a useful tool for understanding the world or solving challenges that humanity faces. Similarly, people who believe in an afterlife may perceive life as meaningful in the context of gaining a place in Heaven. Interestingly, seeking for teleological meaning in such experiences or ideas may to some extent share similarities with what Janoff-

Bulman and Yopyk (2004) call *meaning as significance*, in which people make sense of traumatic events by reflecting on the significance and impact that these have on them.

Contribution, Boundary Conditions, and Future Directions

The current research presents a novel approach to meaning: Rather than conceptualizing the meaningfulness of behavior in epistemic terms, we propose a teleological approach to meaning, and in particular we propose an expectancy x value hypothesis. As predicted, we found empirical support that people's appraisal of the meaningfulness of behavior is consistent with this hypothesis. Generally speaking, behavior was perceived as most meaningful when it was highly instrumental in the pursuit of valued goals.

There are a number of potential boundary conditions, however, that future research may examine further. Consider the following example: The behavior of applying for a promotion may appear less meaningful when one is doing this only for the associated gain in income rather than as a token of appreciation for hard work, even though both goals may be deemed highly valued. Similarly, the gratification of basic needs such as sleep, hunger, or thirst may often be perceived as having high value, without the behavioral means being regarded as particularly meaningful. Possibly, not all goals contribute equally to the interactive effect with instrumentality due to boundary conditions. First of all, it is possible that meaningfulness is more closely related to intrinsic than extrinsic goals. This assumption is consistent with the findings suggesting that intrinsic motivation is an important element of autonomy (e.g., Deci & Ryanm, 1985) and goal authenticity (Shaldon & Kasser, 1995). According to Kasser and Shaldon (2004, p. 484), such authentic goals are characterized by being motivated for autonomous interests and involve the absence of internal or external pressure. Future research should address whether our expectance x value approach with regard to the inference of meaningful behavior holds for intrinsic as well as for extrinsic goals.

What might be the function of meaning appraisals of behavior? Is meaningfulness an experiential outcome of the expectancy \times value interaction? Does it serve some distinct psychological function? Consistent with psychological research on existential questions, we argue that meaningfulness is a psychological experience and a crucial motivational variable that underlies people's judgments and behaviors. Although past research has frequently suggested an essential role of meaning as motivational variable in dealing with existential threats (e.g., Heine et al., 2004; Greenberg et al., 2004), potential mediating or moderating roles in self-regulatory processes have only sporadically been examined. One notable example is the research by Landau and colleagues (2006), who identified that responses to modern art were moderated by the extent to which modern art had (epistemic) meaning, indirectly derived from individual differences in need for structure. Recent findings on the experience of boredom (Van Tilburg & Igou, 2011a; 2012) shed some additional light on the potential motivational role that meaning appraisals serve. This line of research suggests that the lack of meaning associated with boredom serves an important self-regulatory cue that triggers the pursuit of activities directed at attaining a sense of meaningfulness. Specifically, the engagement in boring activities triggers the subsequent motivation to engage in meaningful courses of action. This motivation then acts as mediator for ingroup identification, which an established source of meaningfulness (e.g., Castano et al., 2004; Spears et al., 2004).

Although the debate whether or not meaning serves as a motivational factor has mostly been restricted to theorization, the above findings suggest that it indeed serves an important self-regulatory function. Such a self-regulatory function is also consistent with past research on the experience of hope (e.g., Snyder, 2000; 2002). This research suggests that hope promotes psychological benefits and can emerge from expectancy \times value interactions. By identifying two elements that make behavior meaningful (instrumentality and goal value),

the current project enables future research to manipulate the meaningfulness of compensatory efforts stemming from for example boredom and mortality salience in an attempt to identify what motivational role meaning may fulfill. Clearly, future research should examine in detail whether meaning serves a motivation function in addition to being an evaluative outcome of expectancy \times value interactions.

Conclusion

‘Meaning’ and ‘meaningfulness’ are increasingly important concepts in psychological research (e.g., Baumeister, 1992; Greenberg et al., 2004, Heine et al., 2006; Steger et al., 2006). The current research presents a teleological approach to the understanding of meaningful behavior by adopting a specific expectancy \times value perspective, distinguishing between the value of the goals that the behavior may serve and the instrumentality with which it serves the goals. In essence, our results show that *people’s perception of the meaningfulness* of behavior is applied exclusively for a particular configuration of goal value and instrumentality. The term ‘meaningfulness’ is not just used for any instrumental behavior or any act that is associated with an important goal, but the term is reserved for behavior that satisfies *both* these criteria.

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Footnotes

¹ The key terms in the scale's items were originally modeled after concepts used to refer to meaning in for example Steger et al. (2006, p. 85; p. 85; p. 80) and Baumeister (1991; p. 16; p. 49); the items were successfully used in our prior research (Van Tilburg & Igou, 2011c).

² Gender did not seem to have any systematic effect on our results across any of the five studies. Overall, six marginal effects were observed and only one unexpected significant effect. Specifically, a marginal effect of gender on the instrumentality manipulation check was observed in Study 4, $F(1, 221) = 3.60, p = .06, \eta^2 = 0.01$. Moreover, in Pilot Study I a marginal main effect of gender on the aggregated value of travelling and donating was found, $F(1, 29) = 3.04, p = .09, \eta^2 = 0.10$, as well as two marginal interaction effects of gender on the difference between value attached to watching television versus travelling, $F(1, 29) = 3.16, p = .09, \eta^2 = 0.10$, and the difference between watching television and reading comics, $F(1, 29) = 2.96, p = .10, \eta^2 = 0.09$. A fourth marginal interaction with gender was observed in Pilot Study II with the difference in perceived instrumentality of watching television for one hour versus two hours, $F(1, 18) = 2.99, p = .10, \eta^2 = 0.14$, and a fifth marginal effect involved an interaction with instrumentality in Study 5, $F(1, 85) = 3.50, p = .07, \eta^2 = 0.13$. The sole significant effect of gender was an interaction with the goal value factor in Study 5, $F(1, 85) = 5.54, p = .02, \eta^2 = 0.11$.

³ Levene's test indicated a violation of the assumption of equal variances across conditions, $F(3, 74) = 5.37, p < .01$. The analysis with \log_{10} transformed meaninglessness scores yielded similar results. High goal value led to lower levels of perceived meaninglessness of behavior than low goal value, $F(1, 74) = 7.99, p < .01, \eta^2 = .10$, and high instrumentality of behavior led to lower meaninglessness ratings than low instrumentality, $F(1, 74) = 6.71, p = .01, \eta^2 = .08$. Importantly, also the critical interaction between goal value and instrumentality emerged, $F(1, 74) = 14.47, p < .001, \eta^2 = .16$. Details can be provided on request.

⁴ We identified outliers based on the criteria based on Tabachnick and Fidell (2007; pp. 73-76). Regarding univariate outliers, participants with very large standardized scores ($Z > 3.29$, $p < .001$) were excluded. Regarding multivariate outliers, participants' Mahalanobis distances were computed based on the variables of the design, but excluding age and gender. The mahalanobis distances were then compared to a χ^2 distribution and those participants exceeding a critical value with a α -level of .001 were considered to be outliers.

⁵ Similar results were obtained when including participants' assigned group as between subjects variable and treating each of the behaviors as group-dependent indicator, as analyzed in a 2 (Goal Value) \times 2 (Instrumentality) \times 2 (Group) mixed-ANOVA. This analysis yielded the critical three-way interaction, $F(1,87) = 6.54$, $p = .01$, $\eta^2 = .07$, and a two-way interaction under high goal value, $F(1,87) = 9.15$, $p < .01$, $\eta^2 = .10$, but not under low goal value ($F < 1$). Details can be provided on request.

Table 1

Examples of Listed Behaviors and Goals (Study 1)

Instrumentality	Low Goal Value Condition		High Goal Value Condition	
	Goal	Behavior	Goal	Behavior
Low	'sleeping in'	'Setting my alarm for 7'	'to get a job'	'It wouldn't help if I would think of all the possible things that might go wrong'
High	'being really good at grammar'	'checking the red lines in Word to see where I made mistakes'	'Dieting'	'sports, like playing tennis and jogging'

Table 2

Overview of the Design Employed in the Main Experiment (Study 5)

Group (Between)	Instrumentality (Within)	
	Low	High
A		
Goal Value (Within)		
High	Traveling World 2 Weeks	Donating €100
Low	Watching TV 1 hour	Reading 2 Comic Albums
B		
Goal Value (Within)		
High	Donating €50	Traveling World 2 Months
Low	Reading 1 Comic Album	Watching TV 2 hours.

Note: The study employed a 3-factorial design. Instrumentality and Goal Value were within-participants variables. We varied between participants whether the specific high versus low valued goal behavior was high versus low in instrumentality.

Figure 1: The Meaninglessness of Recalled Behaviors (Study 1)

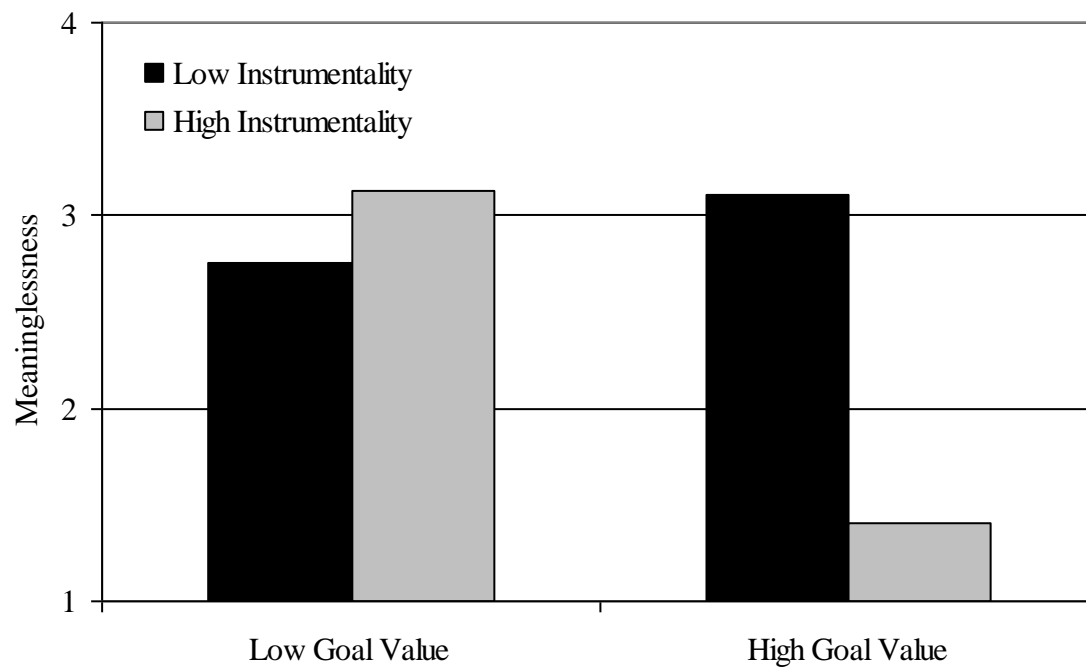


Figure 1: Perceived meaningfulness of participants' own past behavior as a function of the behavior's associated goal value and the instrumentality of the behavior for the pursuit of this goal.

Figure 2: The Meaningfulness of Running (Study 2)

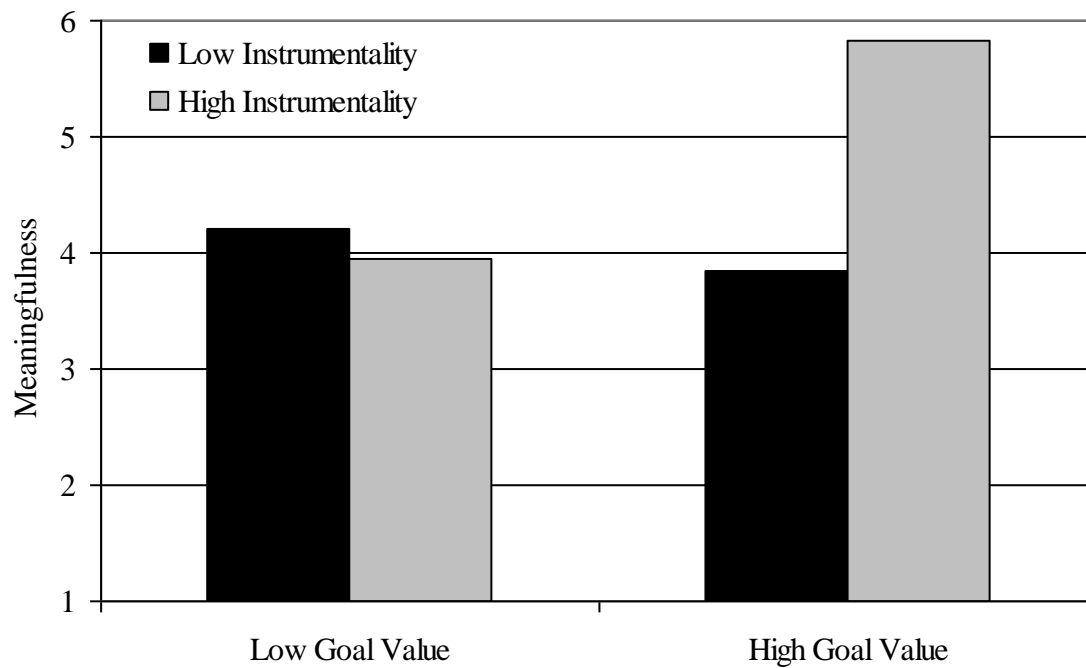


Figure 2: Perceived meaningfulness of 'running along the forest's training course for a very long time' as a function of the behavior's associated goal value and the instrumentality of the behavior for the pursuit of this goal.

Figure 3: The Meaningfulness of Running (Study 3)

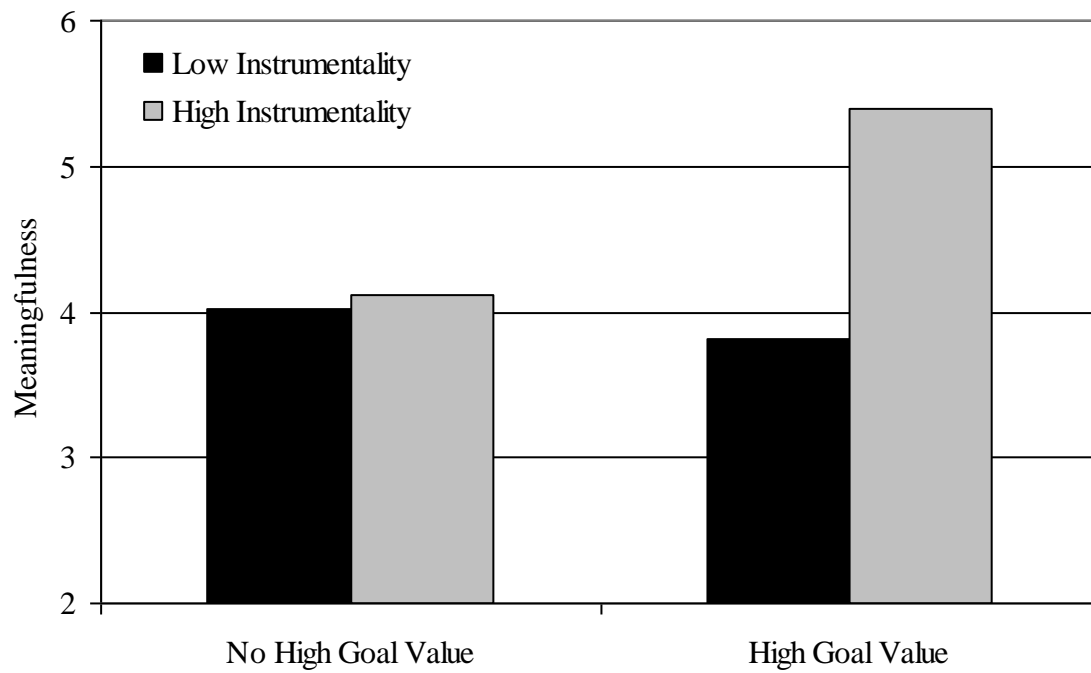


Figure 3: Perceived meaningfulness of 'running along the forest's training course for a very long time' as a function the instrumentality and the presence of a superordinate goal.

Figure 4: The Meaningfulness of Running (Study 4)

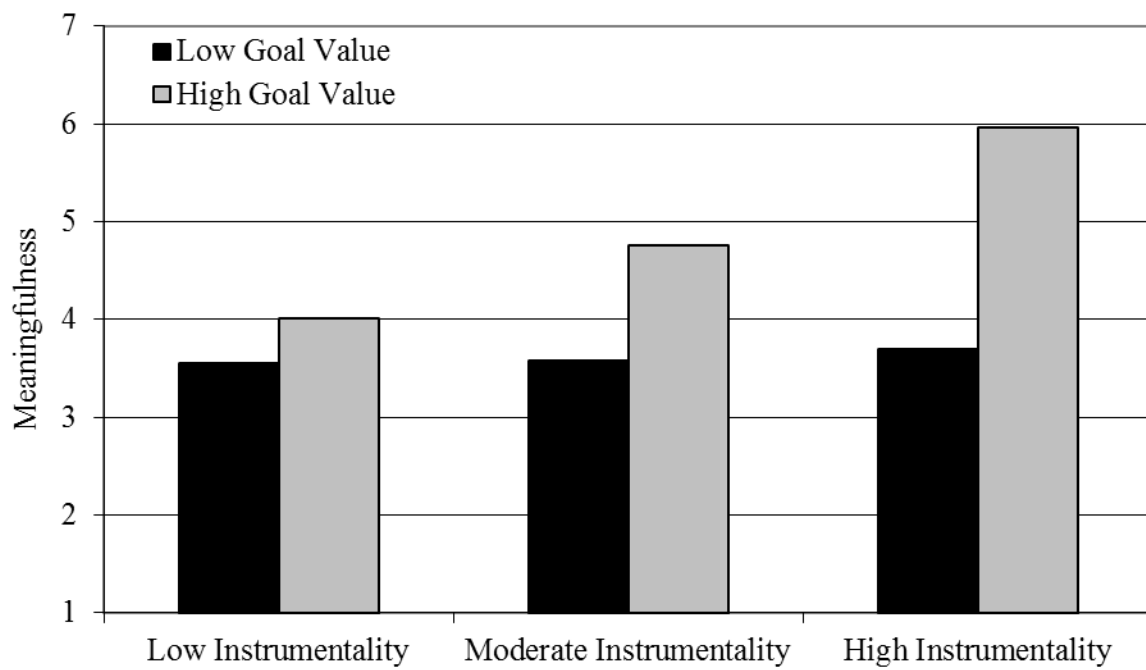


Figure 4: Perceived meaningfulness of 'running along the forest's training course for a very long time' as a function of the behavior's associated goal value and the instrumentality of the behavior for the pursuit of this goal

Figure 5: The Meaningfulness of Common Behaviors (Study 5)

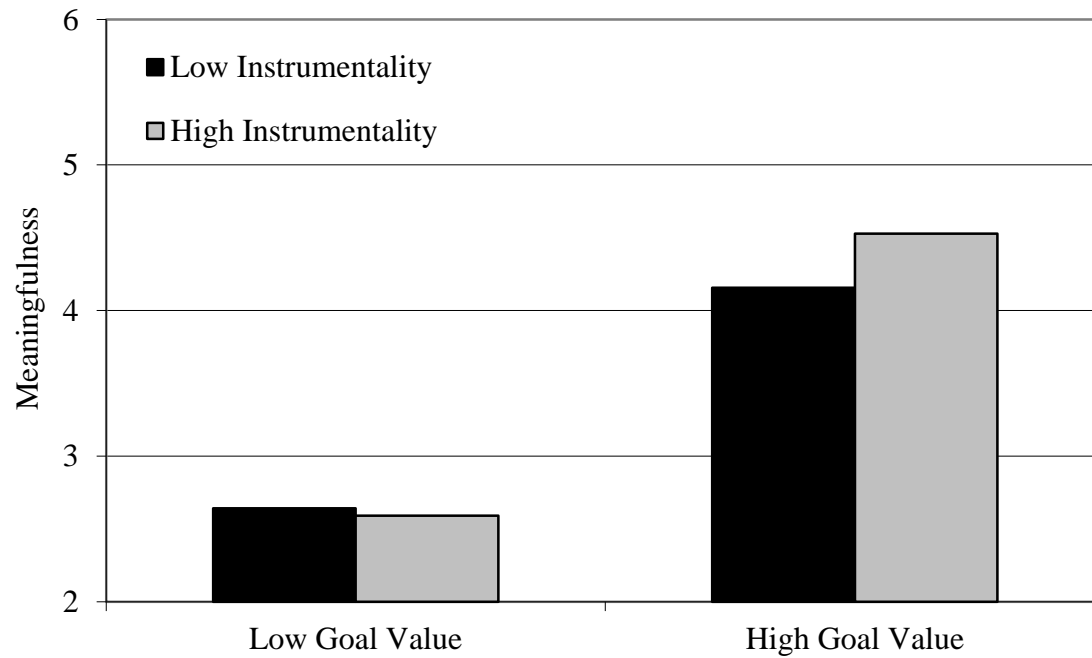


Figure 5: Perceived meaningfulness of common behaviors as a function of their goal value and instrumentality in the pursuit of this goal.