Embodied metaphor and the "true" self: Priming entity expansion and protection influences intrinsic self-expressions in self-perceptions and interpersonal behavior

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ABSTRACT

Drawing on conceptual metaphor perspectives and embodied cognition theories, we proposed that the intrinsic self-concept–who people think they truly are–is represented metaphorically as a physical entity, and that expressions of the intrinsic self-concept are therefore conceptualized in terms of entity activity. Using an empirical strategy for experimentally investigating conceptual metaphor, we tested whether exposure to pictorial primes depicting entity expansion and protection produces metaphor-consistent effects on self-perceptions and interpersonal behaviors expressive of the intrinsic self-concept. In Study 1, participants primed with entity expansion perceived themselves as more self-actualized and less concerned with satisfying extrinsic contingencies of self-esteem. Study 2 showed that this effect was mediated by the increased accessibility of the concept *entity expansion*. In Study 3, expansion-primed participants conformed less to other people's opinions. In Study 4, participants primed with entity protection were less willing to disclose intimate, but not non-intimate, self-knowledge to a stranger.

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In social life people often face concerns about when and how to express their "true, core" self. For instance, they might struggle to find a career path that balances their genuine interests and talents with other people's expectations and standards for success, or they might feel pressure to conceal their authentic attitudes when they suspect others will judge them harshly. These are not trivial concerns, since expressions of the *intrinsic self-concept*–who people think they truly are–significantly impact cognitive and behavioral outcomes associated with positive psychological functioning. Research shows, for example, that the degree to which people adopt intrinsically oriented goals is positively associated with feelings of self-actualization, and is negatively associated with self-perceptions indicative of psychological distress (Kasser & Ryan, 1996). Related experimental research shows that focusing people on intrinsic, but not extrinsic, bases of self-worth reduces defensive tendencies to bolster their personal value over other people's value (Schimel, Arndt, Pyszczynski, & Greenberg, 2001), and also reduces conformity to other people's opinions (Arndt, Schimel, Greenberg, & Pyszczynski, 2002).

Given the significance of intrinsic self-expressions in self-perceptions and interpersonal behavior, it is important to understand ways that people represent the intrinsic self-concept and how those representations impact intrinsic self-expressions. One relevant observation is that people conventionally talk about the intrinsic self metaphorically as a core-like entity embedded inside of an external casing or shell (e.g., "I want you to find who I am *inside*, beneath the *surface*"). This core entity stands for one's "essence" or true self, while the external shell corresponds to the *extrinsic* or publicly presented self that is not always consistent with the true self (cf. Lakoff & Johnson, 1999).

Linguistic analyses show that speakers of diverse languages routinely extend this entity metaphor to describe both enhanced and inhibited expressions of the intrinsic self in terms of entity expansion and protection, respectively. For example, Swiss students spontaneously describe the enhanced influence of their intrinsic self as entity expansion (e.g., "I am *growing* inside," "I want to *expand* my interests"; Moser, 2007), and Japanese individuals describe reluctance to express their intrinsic self as entity concealment (e.g., "He rarely *puts out* (his) real self" [literal translation]; Lakoff & Johnson, 1999, p. 286). These entity-metaphoric expressions are so pervasive that they even figure prominently in academic discourse on intrinsic self-expressions (e.g., Aron & Aron, 1997; Burris & Rempel, 2004; Goffman, 1959; Jung, 1953). Rogers (1961), in particular, characterized the intrinsic self as an "inner core" which expands (under facilitating conditions) to express its true nature and responds to perceived social threats by seeking shelter behind external "façades."

These linguistic metaphors are so conventional that they are usually taken to be part of the tacit background of seemingly literal meanings, and yet they are senseless when interpreted literally, because abstract

self-conceptions share virtually no actual similarities to physical entities. What significance does this observation have for understanding how people represent and express the intrinsic self-concept? One possibility is that these linguistic metaphors are merely ornamental figures of speech. A more interesting possibility is suggested by perspectives on conceptual metaphor (Gibbs, 1994; Lakoff & Johnson, 1980), which posit that although metaphor is often reflected in language, it is primarily a cognitive mechanism that people use to understand abstract concepts in terms of superficially dissimilar concepts that are relatively easier to comprehend. More specifically, conceptual metaphor operates as a mental mapping between select elements of a concrete concept and corresponding elements of a superficially dissimilar, relatively more abstract concept. The concrete concept typically comes from the knowledge base we acquire through recurring interactions with the physical world, such as moving backwards and forwards and manipulating physical objects. With conceptual metaphor, people are able to use this concrete knowledge as an analogical framework for structuring their understanding of an abstract concept, even though the concrete and the abstract concept may share little to no superficial similarity. Similar accounts have been derived from theories of embodied cognition, which posit that processing abstract concepts often involves mental simulations of bodily states (e.g., sensations) that occur during interactions with the physical world (Niedenthal, Barsalou, Winkielman, Krauth-Gruber, & Ric, 2005).

Drawing on these perspectives and the aforementioned ways in which people talk about the intrinsic self, we posit that people represent the intrinsic self-concept as a physical entity. We suspect that people employ this metaphor because commonplace knowledge of physical entities is useful for conceptualizing analogous properties of the intrinsic self-concept. People generally experience isolated physical entities (e.g., a desk) as singular and integral rather than manifold and fragmentary, and as retaining their essential characteristics across different situations and time periods. Analogously, the personal characteristics that make up the "true" self are perceived as unified, essential, and resistant to the shifting standards of socially prescribed value (in contrast to the various "masks" or "façades" that constitute the extrinsic self-concept; Anderson & Ross, 1984).

An entity-metaphoric representation of the intrinsic self-concept is useful not only for conceptualizing the intrinsic self's properties, but also for understanding intrinsic self-expressions. People generally experience physical objects as increasing in strength and influence as they expand in size (e.g., plants growing, insect bites enlarging). Through the mechanism of conceptual metaphor, people can apply that knowledge to conceptualize the enhanced influence of the intrinsic self in terms of entity expansion. Similarly, protecting a core-like entity against harm often entails concealing it beneath a protective layer. People can therefore understand the inhibited expression of the intrinsic self (e.g., in the face of social threats) in terms of entity protection. This analysis suggests that an entity-metaphoric representation of the intrinsic self-concept can significantly impact intrinsic self-expressions, with consequences for associated outcomes such as concern with social approval, perceived self-actualization, and a tendency to protect the core of who one really is against social threats. The current studies examine these possibilities.

Before doing so, however, we wanted to test the basic hypothesis that people are more likely to perceive their intrinsic self as an integral physical entity compared to their extrinsic self. We randomly assigned 58 undergraduates (30 males, 28 females) to visualize either their intrinsic self (defined for participants as: "The traits, feelings, and experiences that define who you really are") or their extrinsic self ("The person you present to other people") and then answer a single question: "How much does your mental image of your intrinsic (extrinsic) self resemble a single, solid entity?" ($1 = not\ at\ all,\ 7 = very\ much$). As predicted, participants were more likely to visualize their intrinsic self as an entity ($M = 5.34,\ SD = 1.47$) compared to their extrinsic self ($M = 3.62,\ SD = 1.29$), $t(56) = 4.74,\ p < .001$. These results offer sugges-

tive evidence that people think about the intrinsic self as a physical entity. It is quite possible, however, that participants in this study were responding on the basis of how people conventionally *talk* about the intrinsic and extrinsic self, rather than how they actually understand these concepts.

To provide stronger tests that entity metaphors shape the representation of the intrinsic self-concept, and to explore the consequences of such representation for intrinsic self-expressions in perception and behavior, we used the *metaphoric transfer strategy*, which has been employed in numerous lines of research in social and cognitive psychology to investigate whether metaphors operate at a conceptual, rather than exclusively linguistic, level of processing (for a review of this work, see Landau et al. in press). This strategy involves assessing whether manipulating psychological states (e.g., perceptions, motivations) related to one concept changes how people process information related to a superficially dissimilar concept in a manner consistent with their metaphoric relation. The reasoning is that if concrete concepts are actually used as vehicles for representing dissimilar abstract concepts, then manipulating perceptions or judgments related to a concrete concept should transfer across the metaphor's conceptual mapping and produce parallel changes in perceptions and judgments related to the abstract concept. Furthermore, insofar as metaphors operate at a conceptual level, and not "merely" at a linguistic level, metaphoric transfer effects should be obtained even in contexts where linguistic expressions of the relevant metaphors are not made salient.

As an example of a study demonstrating metaphoric transfer, Williams, and Bargh (2008) found that participants who simply held a warm (versus cold) beverage subsequently described a target person as having a "warmer" personality (e.g., more generous and caring), suggesting that conceptions of interpersonal "warmth" are represented at least partly in terms of sensory experiences with physical temperature.

The current research utilizes the metaphoric transfer strategy to assess whether exposure to pictorial stimuli designed to prime perceptions of entity expansion and entity protection produces metaphor-consistent effects on intrinsic self-expressions in self-perceptions and interpersonal behavior. Studies 1 and 2 tested whether priming entity expansion leads people to view themselves as more self-actualized and less concerned with satisfying extrinsic (vs. self-determined) contingencies of self-esteem. Study 3 tested whether priming entity expansion reduces conformity to the opinions endorsed by the social majority. Study 4 tested whether priming entity protection decreases people's willingness to disclose intimate self-knowledge in the context of a social interaction with an unfamiliar person.

Study 1

Two outcomes associated with the enhanced expression of the intrinsic self-concept are a greater sense of self-actualization and attenuated concern with extrinsically defined (vs. self-determined) standards of value (Kasser & Ryan, 1996; Williams, Schimel, Hayes, & Martens, 2009). If, as we claim, people conceptualize the enhanced expression of their intrinsic self metaphorically as a physical entity expanding in size (and thus influence), then priming perceptions of entity expansion should lead people to perceive themselves as more self-actualized and less concerned with satisfying extrinsic standards of worth. Study 1 tested this hypothesis. Participants were briefly exposed to a pictorial prime depicting a series of expanding or contracting squares. The contraction condition allowed us to examine whether the hypothesized effect was simply due to priming general changes in entity size or motion, rather than expansion per se. Participants subsequently completed measures of self-actualization and concern with meeting extrinsic contingencies of self-esteem. We also assessed self-reported affect to test the alternative possibility that the hypothesized effects are due to variations in subjective affect or mood.

Method

Participants were 32 undergraduates (19 females, 13 males).[1]

Entity prime manipulation

In a study purported to be about perceptual skills and personality, participants first completed a computerized categorization task which exposed them to perceptual movements consistent with either entity expansion or contraction. The instructions informed participants that a letter string would appear in the middle of the screen and that their task was to quickly categorize the letter string as a word (by pressing the "z" key) or a non-word (the "/" key). All participants were randomly presented with 50 letter strings, 25 non-words and 25 neutral words (e.g., folder, table). In between each trial, and ostensibly as a cue to prepare for the upcoming trial, five different-sized blue squares appeared at the center of the screen for 250 ms each. The squares were sized at (in pixels) 20×20, 80×80, 140×140, 200×200, and 260×260. Participants in the entity expansion condition saw the series progress from the smallest square to the largest square. Participants in the entity contraction condition saw the reverse sequence.

Affect

Next, participants completed Watson, Clark, and Tellegen's (1988) Positive and Negative Affect Schedule (PANAS), indicating the extent to which they were currently experiencing 10 positive (e.g., excited; $\alpha = .90$) and 10 negative (e.g., scared; $\alpha = .84$) emotions ($1 = very$ *slightly or not at all*; $5 = extremely$).

Extrinsic contingency focus

Participants then completed Williams et al.'s (2009) 20-item Extrinsic Contingency Focus scale (ECF), which assesses concern with meeting extrinsically derived contingencies of self-esteem. Participants indicated their level of agreement with statements such as "I often get concerned with how others are evaluating me" and "I work hard at things because of the social approval it provides" ($1 = strongly$ *disagree*; $5 = strongly$ *agree*). Responses were averaged to create a single ECF score ($\alpha = .74$), with higher scores indicating greater extrinsic contingency focus.

Self-actualization

Jones and Crandall's (1986) 15-item Self-Actualization Index (SAI) was used to assess perceived self-actualization. Participants indicated their agreement with statements such as "It is better to be yourself than to be popular" and "I can express my feelings even when they may result in undesirable consequences" ($1 = disagree$ *strongly*; $4 = agree$ *strongly*). SAI scores were calculated as the mean response across all items ($\alpha = .54$),[2] with higher scores indicating greater perceived self-actualization.

Results

ECF and SAI scores were submitted to separate *t*-tests comparing entity expansion and entity contraction conditions. Both tests returned results consistent with predictions. Participants exposed to an expanding entity reported less concern with satisfying extrinsic contingencies of self-esteem ($M = 2.74$, $SD = .47$) than did participants exposed to a contracting entity ($M = 3.01$, $SD = .39$), $t(30) = 2.39$, $p = .02$, $d = .83$. Expansion-primed participants also reported feeling more self-actual-

ized ($M = 2.94$, $SD = .32$) than did contraction-primed participants ($M = 2.73$, $SD = .20$), $t(30) = 2.30$, $p = .03$, $d = .78$. Furthermore, the entity prime condition had no effect on scores for either the positive or negative affect subscales of the PANAS ($ps > .70$), and our primary predicted effects remained statistically significant ($ps < .02$) when controlling for self-reported affect.

Discussion

Exposure to a pictorial prime depicting an expanding (vs. contracting) entity led participants to report less concern with meeting extrinsically derived self-esteem contingencies and higher levels of self-actualization, but had no effect on self-reported affect. These results provide support for the broader hypothesis that intrinsic self-expressions are conceptualized metaphorically as the activity of an integral physical entity. Study 2 was designed to replicate this effect while assessing some alternative explanations.

Study 2

The guiding interpretation of Study 1's results is that priming pictorial stimuli related to the embodied concept *entity expansion* increased the accessibility of that concept, which in turn produced metaphor-consistent effects on perceptions of the relatively more abstract intrinsic self-concept. Critically, however, Study 1 did not provide direct evidence that the priming effect was mediated by the accessibility of the relevant concept. Consequently, the results are open to alternative interpretations. For example, exposure to a bright blue square increasing in size may have simply primed participants with bright color, which has been shown to be metaphorically linked to positively valenced judgments (e.g., Meier, Robinson, & Clore, 2004). This alternative possibility is unlikely given that the color of the stimulus shapes was held constant across conditions, and moreover, the entity expansion condition did not produce a general tendency toward positive judgments as measured by the PANAS. Nevertheless, it remains to be directly assessed.

Also, researchers (e.g., Mühlberger, Neumann, Wieser, & Pauli, 2008) have presented participants with depictions of expanding objects to induce the illusion that the objects are approaching the self in space, so it is possible that participants in the entity expansion condition were primed with entity approach rather than entity expansion per se. To ascertain if the hypothesized effect is in fact due to priming perceptions of entity expansion, we designed Study 2 to test whether exposure to a pictorial prime depicting entity expansion facilitates lexical decision responses to words related to the concept *entity expansion* (e.g., "grow"), and whether this accessibility index mediates the priming effect on perceived self-actualization.

It is also possible that the effects observed in Study 1 were the result of exposure to an enlarging visual array rather than the expansion of an integral entity per se. Such an explanation would be partly supported by research showing that people positively associate increases in perceptual size with increased social significance (Bruner & Goodman, 1947). To test this possibility, Study 2 included a comparison condition in which participants were exposed to depictions of a shape that enlarges at the same rate and extent as the shape used in the entity expansion condition, but which additionally fragments into an array of smaller shapes. If, as the guiding analysis suggests, the intrinsic self-concept is represented as an *integral* entity, exposure to an enlarging fragmenting shape should not engender the same effects on intrinsic self-perceptions as exposure to an expanding integral shape.

Finally, Study 1 was limited by its lack of a true neutral condition, which makes it possible that the observed priming effect was due to a decrease in perceived self-actualization in the entity contraction condition, rather than an increase in the entity expansion condition (as we hypothesize). We addressed this possibility in Study 2 by

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[1] Preliminary analyses revealed no significant effects involving gender in the current studies; we omitted this factor from subsequent analyses.

[2] Although the reliability was somewhat low for this measure, Jones and Crandall (1986) report a reliability coefficient in this general range ($\alpha = .65$). Self-actualization is a multi-faceted construct requiring a diverse array of items to capture its breadth. This diversity, particularly in a short 15-item measure such as this, may contribute to the reliability coefficient reported in this study. The SAI revealed stronger reliability in a larger sample in Study 2 ($\alpha = .79$).

replacing the entity contraction condition with an entity stasis condition in which participants were exposed to depictions of a static shape.

Method

Participants were 53 undergraduates (29 females, 24 males).

Entity prime manipulation

Participants completed a computerized lexical decision task similar to the one described in Study 1, except that here participants pressed the "1" and the "2" keys on the keyboard's number pad to indicate whether a letter string was a word or a non-word, respectively.

Participants were randomly assigned to the entity expansion, stasis, and fragmentation conditions. Prior to the presentation of each letter string, participants in the entity expansion condition were exposed to a sequence of five red squares [3] expanding in size. The squares were the same size as those used in Study 1. Participants in the entity stasis condition viewed five presentations of the large-sized square (260×260 pixels). Participants in the entity fragmentation condition viewed five presentations depicting a red square fragmenting into an enlarging array of progressively smaller red squares. The overall area (in pixels) of the array in each presentation of the entity fragmentation condition was identical to the area of the squares in the entity expansion condition. In all three conditions, each presentation appeared for 250 ms, and the complete sequence of shapes appeared in the center of the screen for a total of 1250 ms. The presentation of the shapes after each letter string also served as a backward and forward mask for the lexical decision task.

Word stimuli

Participants were exposed to 200 letter strings (100 words, 100 non-words) randomized in order. Of the 100 words, 10 were related to entity expansion: grow, extend, inflate, swell, enlarge, boost, expand, stretch, advance, broaden. The remaining 90 words were unrelated to entity expansion (e.g., beak, gifts). For each set of 10 neutral words, each word in the set was made to match one of the 10 entity expansion-related words on frequency and word length, such that the two sets of words were matched on these dimensions. Each letter string appeared for 1500 ms. Responses that were not made within that time were counted as incorrect. We analyzed reaction times (RTs) for accurate decisions only.

Self-actualization

After finishing all computerized lexical decision trials, participants completed Jones and Crandall's (1986) SAI scale ($\alpha = .79$).

Results

Accuracy

Accuracy ratios for all entity prime conditions ranged from .91 to .96. We submitted them to a 3 (entity prime condition: expansion vs. stasis vs. fragmentation) $\times$ word type (entity expansion-related vs. neutral) mixed-model ANOVA with word type serving as a within-subjects factor. As expected, this analysis revealed no significant effects, $Fs < 1$, $ps > .45$.

Entity expansion accessibility

Submitting lexical decision RTs to the same analysis returned an unexpected main effect for word type, $F(1, 50) = 23.06$, $p < .001$, $\eta^2 = .32$, such that participants were slower to make correct judgments

about entity expansion-related words ($M = 668.04$, $SD = 87.28$) than neutral words ($M = 640.35$, $SD = 79.04$). However, this was qualified by the predicted interaction, $F(2, 50) = 5.93$, $p < .01$, $\eta^2 = .19$. The simple main effect of entity prime condition was significant for entity expansion-related words ($F(2, 50) = 4.02$, $p = .02$) but not for neutral words ($F(2, 50) = .72$, $p = .49$).

Consistent with predictions, pairwise comparisons (Fisher's LSD) revealed that participants exposed to an expanding entity made faster lexical decisions for entity expansion-related words ($M = 625.05$, $SD = 54.05$) compared to participants exposed to a static entity ($M = 693.57$, $SD = 99.97$; $t(34) = 2.60$, $p = .01$) and participants exposed to a fragmenting entity ($M = 690.56$, $SD = 89.72$; $t(34) = 2.69$, $p = .01$). The entity stasis and fragmentation conditions did not differ, $p = .92$. Pairwise comparisons revealed no entity prime condition effects for neutral words ($ps > .25$) or non-words ($ps > .89$).

Self-actualization

Submitting SAI scores to a one-way (entity expansion vs. stasis vs. fragmentation) ANOVA revealed the predicted omnibus effect, $F(2, 50) = 4.39$, $p = .02$, $\eta^2 = .15$. Pairwise comparisons revealed that participants exposed to an expanding entity reported feeling more self-actualized ($M = 2.98$, $SD = .32$) compared to participants exposed to a static entity ($M = 2.75$, $SD = .30$; $t(34) = 2.06$, $p = .045$) and participants exposed to a fragmenting entity ($M = 2.67$, $SD = .30$, $t(34) = 2.73$, $p = .01$). The entity stasis and fragmentation conditions did not differ, $p = .49$.

Mediation analysis

The effect of priming entity expansion on perceived self-actualization was hypothesized to be mediated by the accessibility of the concept *entity expansion*. We used Preacher and Hayes' (2008) bootstrapping procedure and corresponding SPSS macro to test for significant indirect effects, regressing SAI scores onto entity prime condition, which we contrast coded (entity expansion = 1, entity stasis = −.5, entity fragmentation = −.5) because the entity stasis and fragmentation conditions were theoretically specified as comparison conditions, and because the one-way ANOVAs just reported revealed no differences between these conditions on measures of *entity expansion* accessibility and self-actualization. We entered averaged lexical decision RTs (in ms) for entity expansion-related words as the proposed mediator. Five thousand bootstrap resamples were performed. The 95% confidence interval obtained for the indirect effects of the entity prime condition on SAI scores through the mediator of entity expansion-word RT did not contain zero (.02 to .14). Therefore, we are confident at $\alpha = .05$ that the effect of priming entity expansion on perceived self-actualization was mediated by the corresponding increase in *entity expansion* accessibility. Fig. 1 presents a graphical depiction of the mediation model. As can be seen in this figure, while the coefficient representing the indirect effect of entity prime condition on SAI scores was statistically significant ($\beta = .18$, $p < .05$), the coefficient representing the direct effect of entity prime condition after controlling for the mediating influence of *entity expansion* accessibility (as measured by correct lexical decision RTs for entity expansion-related words) was not ($\beta = .12$, *n.s.*). Subsequent analyses revealed that lexical decision speed for neutral words did not mediate the effect of priming entity expansion (confidence interval: −.02 to .09). Taken together, these results support our hypothesis that *entity expansion* accessibility played a significant mediating role in the effect of priming entity expansion on perceived self-actualization.

Discussion

Brief exposures to pictorial depictions of an expanding shape (versus a static shape and an enlarging, fragmenting shape) increased

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[3] For the priming stimuli, we used squares in Studies 1 and 2 and circles in Study 3. We also made the shapes blue in Study 1 and red in Studies 2 and 3. These changes were meant to de-confound perceptions of entity expansion from perceptions of surface features of the stimulus materials which are irrelevant to the proposed conceptual metaphor.
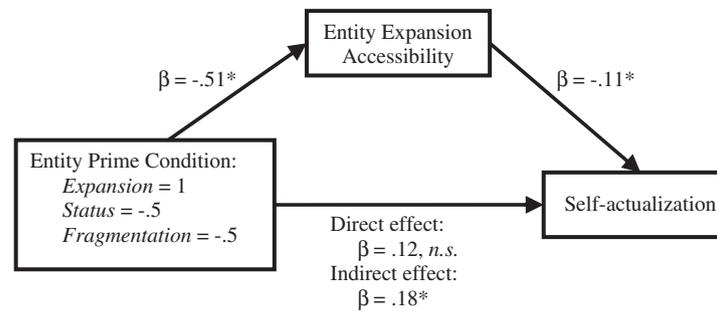
Fig. 1. Mediation model for Study 2. Note. All path coefficients represent standardized regression weights. Those marked with * are significant at $p < .05$. The direct effect coefficient represents the effect of entity prime condition on SAI scores after controlling for the mediating influence of entity expansion accessibility, as measured by correct lexical decision RTs (in ms) for entity expansion-related words. Total adjusted R^2 for the model $= .19$, $F(2, 50) = 6.94$, $p < .01$.

the accessibility of the concept *entity expansion*, which in turn mediated the effect of priming entity expansion on perceived self-actualization. These results replicate the priming effect observed in Study 1 while providing more definitive evidence that this effect is mediated by an increase in the accessibility of the concept *entity expansion*. The results of Study 2 also rule out the possibility that the effect found in Study 1 was due to priming an enlarging visual array (since in Study 2 the entity expansion condition differed from the entity fragmentation condition), or that this effect was due to decreased perceived self-actualization in the entity contraction condition (since in Study 2 priming entity expansion had a parallel effect in comparison to priming a static entity).

Taken together, the results of Studies 1 and 2 provide evidence that priming individuals with the expansion of a physical entity produces metaphor-consistent effects on intrinsic self-expressions in self-perceptions, suggesting that people represent the intrinsic self-concept using their embodied knowledge of physical entities. We conducted Studies 3 and 4 to complement this focus on self-perceptions by testing whether priming entity expansion and protection produces metaphor-consistent effects on intrinsic self-expressions in interpersonal behavior.

Study 3

Study 3 builds on Arndt et al.'s (2002) finding that participants who wrote about their inner personal qualities (relative to extrinsic achievements) showed lower levels of conformity in their evaluations of art. If priming entity expansion heightens intrinsic self-expressions in interpersonal behavior, then we would expect entity expansion-primed participants to show less behavioral conformity. We tested this hypothesis by priming participants with images of an expanding, contracting, or static entity, and subsequently measuring behavioral conformity.

In Study 2 we replaced Study 1's entity contraction condition with an entity stasis condition to provide a stronger test of the specificity of our hypothesized effect to priming entity expansion. Study 3 provided a further test of this specificity by including both an entity contraction condition and an entity stasis condition for comparison with the entity expansion condition.

Method

Participants were 58 undergraduates (31 females, 27 males).

Social desirability

In a study purported to be about personality, perceptual ability, and preferences, participants first completed Crowne and Marlowe's (1960) social desirability measure. Including this scale helped to advance the cover story and provided an opportunity to control for

variation in conformity due to dispositional tendencies to respond in socially desirable ways.

Entity prime manipulation

Participants next completed the computerized categorization task described in Study 1. A series of 5 red circles flashed between each trial. The circles were sized at (in pixels) 20×20, 80×80, 140×140, 200×200, and 260×260, and appeared at the center of the screen for 250 ms each. In the entity expansion condition, the circles were sequenced in order from smallest to largest. In the entity contraction condition the sequence was reversed. In the entity stasis condition, the middle-sized circle appeared for 1250 ms (the total sequence duration in the other conditions).

Conformity measure

The materials and procedure for assessing conformity were modeled directly after those utilized by Arndt et al. (2002). The experimenter gave participants a folder containing six postcard-sized, color-copied paintings to evaluate (all participants saw the same paintings). The experimenter explained that, because the paintings were part of an ongoing study, they had been evaluated by other participants over the last few semesters. He noted that some evaluations would already be written on the forms, and evaluations should be made on the next available line. Underneath each painting were a total of 23 ratings ostensibly made by past participants. These ratings filled the entire first page, requiring all participants to make their ratings on the first line of the following page (so that we could easily remove them and reuse the folders). The pattern of prior ratings was different for each painting. Three of the paintings had average ratings of "7," and the other three paintings had average ratings of "3," on a 9-point scale. Thus, three paintings were generally liked by others, and three paintings were generally disliked by others. There were two versions of the folders, such that the three "liked" paintings in one version were "disliked" in the other version and vice-versa.[4] Participants made their ratings on a 1 (*I don't like this painting at all*) to 9 (*I like this painting very much*) scale. Ratings for the "disliked" paintings were reverse scored and averaged with the ratings of the "liked" paintings to create a single conformity score ($\alpha = .90$). Higher scores indicated greater levels of conformity (as per Arndt et al., 2002).

Results

Submitting conformity scores to a one-way ANOVA (entity expansion vs. contraction vs. stasis) returned a significant omnibus effect, $F(2,57) = 3.62$, $p = .03$, $\eta^2 = .12$. Supporting predictions, pairwise

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[4] We observed no significant effects involving the relationship between painting and average rating, and omitted this factor from subsequent analyses.

comparisons revealed that participants primed with an expanding entity exhibited less conformity ($M = 4.91$, $SD = .59$) than participants exposed to a contracting entity ($M = 5.42$, $SD = .81$; $t(36) = 2.12$, $p = .03$) and participants exposed to a static entity ($M = 5.48$, $SD = .74$; $t(37) = 2.64$, $p = .02$). The entity contraction and stasis conditions did not differ in conformity levels, $p = .80$. These effects remained significant ($ps < .04$) when controlling for social desirability.

Discussion

Participants exposed to pictorial depictions of entity expansion (vs. contraction and stasis) were more willing to express themselves in ways that ran counter to social preferences, and individual differences in social desirability could not account for this effect. These findings extend the results of Studies 1 and 2 to show that priming entity expansion heightens intrinsic self-expressions in interpersonal behavior as well as self-perceptions, thereby providing further support for our broader claim that intrinsic self-expressions are conceptualized metaphorically as the activity of a physical entity. Also, because in Study 3 we found no significant difference in conformity levels between the entity contraction condition and the entity stasis condition, we are confident that the observed effect of priming entity expansion on facilitating intrinsic self-expressions is specific to priming entity expansion.

While the findings from the preceding studies demonstrate metaphor-consistent effects of priming entity expansion on *facilitating* intrinsic self-expressions, the guiding analysis also suggests that priming perceptions of a physical entity being protected against harm should *inhibit* intrinsic self-expressions. Study 4 examines this possibility while continuing to focus on behavioral outcomes.

Study 4

People conventionally talk about a reluctance to reveal aspects of the "true" self to others metaphorically as the physical protection of intimate self-knowledge against perceived external threats (Lakoff, 1997; Moser, 2007). Similarly, theorists such as Rogers (1961) used entity protection metaphors to characterize the process by which protective exterior personas block expressions of one's true, core self. If these metaphoric expressions reflect an underlying representation of the intrinsic self-concept as a core-like entity that can be protected, then priming the physical protection of a core-like entity should decrease willingness to disclose intimate self-knowledge to an unfamiliar other in the context of a social interaction, but should not affect willingness to disclose self-knowledge that is unrelated to one's core sense of self.

To test these hypotheses, we exposed some participants to a sequential animated depiction of a sphere being protected by a surrounding layer against encroaching agents. Participants in the control condition viewed the same pictorial stimuli interact in a way that did not depict entity protection.

Following the entity prime manipulation and in an ostensibly unrelated task, participants chose which self-relevant questions they would be willing to answer in an upcoming conversation with a stranger. Some of these questions pertained to intimate or highly personal matters, while others pertained to more superficial aspects of the self. We predicted that participants primed with entity protection would elect to answer fewer intimate questions compared to participants in the control condition, whereas entity prime condition would not influence willingness to answer non-intimate questions.

Because in this study we used a new entity prime manipulation that was different from the manipulation used in Studies 1 to 3, we measured self-reported affect, as we did in Study 1, in order to test whether the hypothesized effect is simply due to variations in self-reported mood or affect.

Method

Participants were 44 undergraduates (21 females, 23 males).

Entity prime manipulation

Participants first took part in a computer task described as a "visual imagery task." All participants viewed four consecutive screens depicting shapes in an action sequence, but the nature of this sequence differed according to randomly assigned condition. In the entity protection condition, the first screen depicted a sphere surrounded by a translucent layer. With successive screens, increasing numbers of seed-like shapes–which we refer to as *agents*–entered from the screen's perimeter and advanced toward the sphere, but the external layer blocked the agents from reaching the sphere. The control condition resembled the entity protection condition in that the first screen depicted the same layer-surrounded sphere and successive screens depicted an increasing number of agents, but in this condition the agents entered the screen in a random fashion and did not encroach upon the sphere. The images used across conditions were equivalent in all possible respects, including the number of agents and the speed of their apparent motion. Each screen appeared for 5 s. To control for the possibility that the images used in the different conditions differed in overall vividness, we had participants answer the question "How vivid was this image?" ($1 = $ not at all vivid; $5 = $ extremely vivid) following each screen. Responses were averaged to form composite vividness scores ($\alpha = .83$).

Affect

Immediately following the entity prime manipulation, participants completed Watson et al.'s (1988) PANAS (positive affect $\alpha = .90$; negative affect $\alpha = .89$).

Self-disclosure measure

Next, participants were asked to take part in a "getting acquainted" task that was allegedly unrelated to the "visual imagery task." They were told they would soon interact with another participant in an adjacent cubicle. They first received filler information (e.g., age, academic major) about their upcoming interaction partner. They were then told that, prior to being connected with the partner via a computer network connection, they would have the opportunity to select which questions out of a total list of questions they felt comfortable having their interaction partner ask of them. Eight questions, presented in random order, appeared individually in the center of the screen. Participants were instructed to click either the "yes" or the "no" button that appeared underneath each question to indicate whether that question was admissible in the upcoming conversation.

Half of these questions pertained to intimate aspects of one's personality and experience: "What are your religious or spiritual beliefs? Do you have a secret you've always kept from your parents? What would you most like to change about your childhood? Do you ever feel all alone in the world?" The other questions pertained to less intimate self-knowledge: "Do you prefer warm or cold weather? Are you a "morning person" or an "evening person"? What kind of music do you like? Where would you like to travel?" [5] After participants

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[5] We performed a pilot study to test our assumption that the intimate questions were viewed as more intimate than the non-intimate questions. Twenty-six students recruited from the same subject pool as the main study rated the 8 questions (presented in a random order) on 7-point scales ($1 = $ *not at all personal*, $7 = $ *extremely personal*). Factor analysis with varimax rotation revealed two factors accounting for 46% of the variance. Inspection of the rotated component matrix shows that the non-intimate questions loaded on a single factor (λs ranged from .78 to .87). The intimate questions all loaded on a second factor (λs ranged from .65 to .82). We separately averaged the scores for the non-intimate questions ($\alpha = .86$) and intimate ($\alpha = .80$) questions and submitted them to a dependent samples t-test. As predicted, the intimate questions were rated as more personal ($M = 5.03$, $SD = 1.05$) than the non-intimate questions ($M = 1.74$, $SD = 1.13$), $t(25) = 16.62$, $p < .001$.

made their selections, the computer ostensibly encountered an error while attempting to establish the network connection. The experimenter terminated the study, probed participants for suspicions that the two tasks were related (none were found) and debriefed participants.

Results

To test whether priming entity protection decreased willingness to disclose intimate, but not non-intimate, self-knowledge, we separately summed the number of intimate and non-intimate questions participants elected to answer and submitted them to a 2 (entity prime condition: protection vs. control) × 2 (question type: intimate vs. non-intimate) ANOVA with question type serving as a within-subjects factor. Relevant means for the two-way interaction are presented in Table 1.

We observed an expected main effect for question type, $F(1, 42) = 37.39$, $p < .001$, $\eta^2 = .47$. Inspection of the means and pairwise comparisons revealed that participants were less willing to answer intimate questions than non-intimate questions in both the entity protection condition ($F(1, 42) = 34.58$, $p < .001$) and the control condition ($F(1, 42) = 7.66$, $p < .01$). Inspection of the data revealed that all but one participant elected to answer all the non-intimate questions.

This main effect was qualified by the predicted interaction, $F(1, 42) = 4.85$, $p = .03$, $\eta^2 = .10$. Consistent with predictions, pairwise comparisons revealed that participants exposed to depictions of entity protection elected to answer fewer intimate questions ($M = 2.40$) compared to participants exposed to a similar animated sequence that did not depict entity protection ($M = 3.27$; $F(1, 42) = 5.25$, $p = .03$). In contrast, entity prime condition did not have a significant effect on the number of non-intimate questions participants elected to answer, $F(1, 42) = 1.00$, $p = .32$.

We found no difference in the reported vividness of the pictorial stimuli used in the two priming conditions ($p = .57$), and the primary predicted effects remained significant ($ps < .04$) when controlling for composite vividness ratings. Furthermore, and also as predicted, we found no entity prime condition effects on either positive or negative affect scores ($ps > .56$), and including these scores as covariates did not affect the predicted pattern of significant effects.

Discussion

Participants exposed to depictions of an inner sphere being protected (vs. not protected) from encroaching agents subsequently elected to answer fewer questions of an intimate nature in an upcoming interaction with a stranger, supporting our hypothesis that priming the physical protection of a core-like entity would decrease willingness to disclose intimate self-knowledge to others. In contrast, participants in both conditions were highly willing to answer questions pertaining to non-intimate aspects of the self. Thus, priming entity protection did not simply render participants less communicative or cooperative, but instead specifically decreased their willingness to disclose aspects of the self that connect to who one really is.

Table 1

Number of intimate and non-intimate questions participants elected to answer as a function of entity prime condition (Study 4).

	Entity protection	Control
	$n = 22$	$n = 22$
Intimate	2.40$_a$ (1.50)	3.27$_b$ (.94)
Non-intimate	3.95$_c$ (.21)	4.00$_c$ (.00)

Note: Standard deviations in parentheses. Means with different subscripts differ at $p < .05$.

General discussion

Four studies supported the hypothesis that manipulated perceptions of physical entities would produce metaphor-consistent effects on intrinsic self-expressions in self-perceptions and interpersonal behavior. Participants exposed to a perceptual prime depicting an expanding entity subsequently perceived themselves as more self-actualized (Studies 1 and 2) and less concerned with satisfying extrinsic contingencies of self-esteem (Study 1), and they were more likely to evaluate artworks in a non-conformist manner (Study 3). Study 2 furthermore showed that the effect of priming entity expansion on perceived self-actualization was mediated by the accessibility of the concept *entity expansion*. The effects of priming entity expansion also differed from those of priming entity contraction (Studies 1 and 3) and fragmentation (Study 2), suggesting that these effects are not simply due to priming entity motion or enlarging visual arrays. Study 4 complemented the focus in Studies 1–3 on outcomes associated with facilitated intrinsic self-expression by showing that manipulated perceptions of physical entities can also inhibit intrinsic self-expression in a metaphor-consistent manner. Specifically, participants perceptually primed with depictions of a core-like entity being protected from encroaching agents (vs. a control prime) were subsequently less willing to disclose intimate aspects of their "inner" self, but not superficial self-knowledge, to a stranger. Also, priming entity expansion and protection did not influence self-reported affect (Studies 1 and 4), suggesting that this variable cannot account for the pattern of results observed across the studies.

The present research offers novel insights into how people represent their intrinsic self-concept, and contributes to perspectives on the importance of intrinsic self-expressions (e.g., Deci & Ryan, 1995; Kasser & Ryan, 1996; Rogers, 1961) by demonstrating that such expressions are grounded, at least in part, in superficially unrelated conceptions of the physical world. In this way, the analysis provided here shares some resemblance to the recently proposed amoebic-self theory (e.g., Burris & Rempel, 2004, 2008), which posits that self-representation is aided by an implicitly conceived physical boundary that differentiates between self and not-self. This boundary encases the self, protects it, and allows people to conceive of the self in physical "in" versus "out" terms. Burris and Rempel (2004) further argue that this psychological boundary can be expanded to encase symbolic (e.g., prized possession), as well as physical aspects of the self. Though we have argued that it is specifically the intrinsic self-concept, rather than the entire self, that is represented as a bounded core-like entity, the findings of Study 4 are compatible with the idea that people conceive of self-protection in terms of an entity being protected by an external boundary. We think this compatibility with other treatments of the intrinsic self (e.g., Rogers, 1961) and self-representation (e.g., Burris & Rempel, 2004) is noteworthy, and further highlights the integrative potential that metaphorically enriched perspectives have for better understanding the ways people come to know themselves.

The integrative potential of the present research also raises an important question: Might the entity prime manipulations used in the present research have been activating self-related perceptions other than those tethered to the intrinsic self and thus influenced the outcomes assessed for different reasons? Perhaps, for example, priming entity expansion increased participants' feelings of aggrandized self-importance, which in turn promoted less conformity and greater perceived self-actualization.[6] While this is an intriguing possibility, it is not consistent with the scope of data across studies. Kasser and Ryan (1996) demonstrated that intrinsically-oriented goal aspirations were positively related to self-actualization, but negatively associated with narcissism. Given the previously established dissociation between self-

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[6] We thank an anonymous reviewer for raising this possibility.

actualization and narcissism, it seems unlikely that our entity expansion prime increased both of these constructs simultaneously.

Moreover, models of narcissism emphasize that narcissists are overly reliant on social sources of validation (Kernis, 2001; Morf & Rhodewalt, 2001), a reliance consistent with an extrinsic contingency focus. Thus, it is not clear how a narcissism explanation could account for the Study 1 finding that an expansion prime *decreased* focus on extrinsic contingencies of self-esteem. In addition, while positing an entity-metaphoric representation of the intrinsic self-concept gives rise to the predictions supported in Study 4, we are not aware of how a narcissism alternative could predict or explain these findings. Nevertheless, the ubiquity of entity expansion metaphors in ordinary and scholarly descriptions of excessively high self-evaluations (e.g., "An *inflated* ego") suggests that entity metaphors may still play a role in shaping people's understanding of narcissism as well as the intrinsic self-concept, despite the two constructs differing in important ways. Additional research is certainly needed to further understand which types of self-relevant perceptions and judgments can be activated by entity metaphors and other embodied concepts.

It is also important to note that we are not claiming that entity metaphors are used exclusively to ground intrinsic self-expressions. Linguistic metaphors conventionally link entity expansion to diverse social concepts such as *status* ("She's getting to be a *big player* in her field"), and metaphors also link entity protection to concepts such as *deception* ("They tried to *cover up the whole thing*"). Thus, we might expect that priming perceptions of entity activity would produce metaphor-consistent effects on perceptions of these social concepts in contexts where they are salient. The current research focused on the effects of priming entity expansion and protection in the context of self-relevant perceptions and behavior, because we are interested in understanding the embodiment of intrinsic self-expressions.

The current research can enrich traditional perspectives on the self-concept in social cognition by illustrating the important role of embodiment. Social cognitive theory traditionally relies on the assumption that concepts are mentally represented in terms of language-like propositional content (implemented as a semantic network or features list) that is abstracted from the person's sensory, motor, and affective interactions with the physical world. Consequently, the self-concept has traditionally been characterized as a set of interlinked nodes of self-relevant knowledge represented in an abstract, symbolic format (e.g., Linville & Carlston, 1994). Yet in recent years researchers such as Barsalou (2008) have argued that this traditional view gives little consideration to how concepts are connected to the brain's modal systems for perceiving and interacting with the physical world. As a corrective, these researchers propose that social concepts arise from, and are represented in terms of, recurring patterns of sensation, motor activity, and other bodily states (Niedenthal et al., 2005, reviews supporting research). In line with this embodiment perspective, the current findings are consistent with the notion that people represent the self-concept partly in terms of their perceptual experiences with physical objects.

In addition to this broad theoretical implication, the current research provides a framework for hypothesis generation that has the potential to facilitate new insights into the structure and operation of the self. For example, based on the current work we would predict that people led to conceive of themselves metaphorically as a unified and relatively unchanging entity will perceive more stability and continuity in their self-concept over time than if they conceive of themselves metaphorically in terms of a more variable or dynamic concept (e.g., a tapestry). More generally, while the linguistic analyses discussed in the Introduction suggest that entity metaphors pervade descriptions of the intrinsic self-concept, there is likely to be variability in the extent to which these metaphors are activated and endorsed by different people. This suggests that investigating the situational and individual factors influencing metaphor use may provide novel insights into why certain people show greater self-

consistency, actualization, and other outcomes associated with expressions of the intrinsic self-concept.

At a more practical level, understanding how entity-metaphoric representations of the intrinsic self-concept can facilitate or inhibit genuine self-expression has important implications for psychological well-being. For example, research shows that activating the true self-concept can increase people's perceptions of meaning in life (Schlegel, Hicks, Arndt, & King, 2009). In contrast, *self-silencing*–or the tendency to actively hide or fail to assert one's "true" beliefs, feelings, and attitudes–can disrupt healthy psychological functioning in a variety of ways. Chronic levels of self-silencing have been linked to poor emotional adjustment (Haemmerlie, Montgomer, Williams, & Winborn, 2001), depression (Jack, 1991; Jack & Dill, 1992), increased anxiety and suicidal behavior (Horesh & Apter, 2006), and decreased satisfaction with romantic relationships (Harper & Welsh, 2007). Conversely, increased self-disclosure and uninhibited expression of one's authentic self are an integral part of maintaining healthy intimate relationships (Gable & Reis, 2006) and have been positively associated with both physical (Michael, Colditz, Coakley, & Kawachi, 1999) and mental (Beach, Sandeen, & O'Leary, 1990) health. The current research contributes to a broader theoretical understanding of the conceptual underpinnings of the "true" self, which can be used to design practical interventions encouraging people to live more in line with their genuine personal qualities.

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