

## Individual Differences in Orienting Activity Mediate Feeling Realization in Dreams: I. Evidence from Retrospective Reports of Movement Inhibition

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*Existential dreams, which involve ineffectuality, sadness, and separation (Kuiken & Sikora, 1993), frequently provide shifts in feeling that sensitize dreamers to aspects of their lives they have previously ignored. To better understand that phenomenon, we examined whether individual differences in movement inhibition during the orienting response (either while awake or dreaming) would predict: (a) the enactment of dreams during awakening, (b) a lingering sense of the reality of dream events, and (c) dream-induced self-perceptual depth. Three studies using retrospective questionnaires and one using dream diaries provided consistent evidence of these relationships. Also, individual differences in movement inhibition and in the preceding dream effects were consistently associated with absorption (Tellegen, 1982), a personality dimension related to openness to experience. Finally, results from one study confirmed that dream-induced self-perceptual depth is more closely associated with the occurrence of existential dreams, than with either anxiety dreams (nightmares) or transcendent (archetypal) dreams.*

**KEY WORDS:** dream function; orienting response; self-perception; body awareness.

### INTRODUCTION

Recent classificatory studies (Kuiken & Sikora, 1993; Busink & Kuiken, 1996) have identified a type of dream that involves frustrating ineffectuality, agonizing sadness, and themes concerning separation and loss. These "existential dreams" present profiles of attributes that are clearly differentiable from those that define anxiety dreams (nightmares), transcendent (archetypal) dreams, and mundane dreams. Moreover, existential dreams often provide shifts in feeling that sensitize dreamers to aspects of their lives they have previously ignored—in a manner comparable to the compelling personal insights that occasionally occur during intensive

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waking self-reflection (Kuiken, Carey, & Nielsen, 1987). Although deliberate reflection may compound their influence, the self-perceptual depth prompted by existential dreams seems to be an effect of dreaming per se.

Kuiken (1995) has suggested that the self-perceptual depth attained through existential dreams is precipitated by the feelings of ineffectuality that are among these dreams' typical characteristics. When the emotional feelings associated with personal limitations are accentuated and transformed, such transformations are experienced as an in-depth "realization" of feelings that lingers even after awakening. Kuiken also proposed that the ineffectuality within existential dreams may be mediated by intensification of the neuromuscular inhibition that is normally associated with the orienting response (OR) during REM sleep. The present report is an attempt to substantiate these possibilities by examining whether individual differences in thresholds for OR-related movement inhibition predict the frequency with which dreams provide self-perceptual depth.

### Orienting Activity and Dreamer Embodiment

Morrison (1979; Morrison & Bowker, 1975) proposed that PGO spikes are an initial component of the OR, which is the psychobiological adjustment to a discrepancy between a presented stimulus and the kind of stimulus for which the individual was prepared. When such a discrepancy occurs during wakefulness, the OR provides adjustments in working memory that prepare the individual for continued perception of the novel stimulus. During sleep, the OR is endogenously induced and external stimuli usually are not registered because of the ongoing sensory blockade. Nonetheless, the individual may react *as though* stimulus change has occurred, and adjustments in working memory may be experienced as discontinuities in dream imagery. Congruent with this proposal, peripheral indices of PGO activity (PIPs, MEMAs) are reliably associated with discontinuities in the dream narrative (Bliwise & Rechtschaffen, 1978; Olgilvie, Hunt, Sawicki, & Samanhalskyi, 1982; Rechtschaffen, Watson, Wincor, Molinari, & Barta, 1972; Watson, 1972; Watson, Bliwise, Friedman, Wax, & Rechtschaffen, 1978).

Whereas PGO spikes reflect the initiation of *covert* mnemonic adjustments, a later and peripheral component of the OR is activation of muscle systems involved in the *overt* reallocation of attention. This component reflects the enhanced responsiveness of musculature that is related to the currently salient response modality: sniffing in response to novel olfactory stimulation, EMs in response to novel visual stimuli, etc. Another late and peripheral component of the OR is the transient inhibition, primarily of the postural musculature, that immediately precedes the overt attentional adjustments. This component reflects the slight "freezing" that normally prepares the organism for attention reallocation, and is indicated in humans by phasic EMG suppression and H-reflex inhibition. Intensification and recurrence of this late inhibitory component of the OR seem reflected in existential dream narratives, especially in the sense of ineffectuality that pervades dreamer activities (e.g., exceptional fatigue, feeling weak or unable to move; Kuiken & Sikora, 1993).

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If especially intense and frequently repeated movement inhibition disrupts the dreamer's sense of effective action during existential dreams, one result may be the accentuation of emotional feelings (e.g., frustration, guilt, sadness). In these circumstances, OR-mediated discontinuities in the dream narrative may precipitate different representations of the dreamer's involvement in and emotional feelings about her ineffectuality in the dream situation. Such shifting representations move the dreamer toward increasingly intimate and affectively intricate forms of engagement (cf. Czaya, Kramer, & Roth, 1973). This increased intimacy and affective intricacy is experienced *within the dream* as a form of feeling realization, i.e., as an experiential shift toward greater self-perceptual depth.

Moreover, during the transition from sleep to wakefulness, these increasingly intimate and intricate forms of felt engagement acquire a particularly compelling "reality" because, as OR-related inhibition is attenuated, the dreamer often finds herself enacting aspects of the concluding narrative (e.g., crying while awakening from a sad dream). Such awakening enactment makes the dream imagery seem exceptionally "real" and carries the intimacy and intricacy of the dream directly into the dreamer's waking world. Thus, in their concluding moment, existential dreams acquire a persuasive self-perceptual depth that can sometimes linger long afterwards.

These possibilities are largely unexplored. There is some evidence that, in mundane dreams, emotional feelings emerge in dream situations where they previously had been absent (Foulkes, Sullivan, Kerr, & Brown, 1988) and that, within a dream scene, progressions from positive to negative emotional feelings are more common than progressions from negative to positive emotional feelings (Nielsen, Deslauriers, & Baylor, 1991; Merritt, Stickgold, Pace-Schott, Williams, & Hobson, 1994). But, there has been no examination of the possibility that such emergent and changing feelings are mediated by intensification of the inhibitory component of the OR.

## QUESTIONNAIRE STUDIES

Morrison and Dinges (1986) observed that, in a normal young adult population, OR-related weakness or inability to move is fairly often experienced after sudden emotional events during wakefulness (e.g., surprise, laughter, anger), as well as during dreaming. In our extension of these observations, we examined whether there is cross-state stability in individual thresholds for this movement inhibition pattern. Specifically, we expected a positive correlation between the frequency of self-reported movement inhibition after sudden emotional events during wakefulness and the frequency of reported movement inhibition during dreaming (Hypothesis 1). Moreover, if intensified emotional feelings during dreaming are responses to movement inhibition and the related sense of ineffectuality, both the waking and the dreaming indices of OR-related movement inhibition thresholds should predict how often dreamers awaken to find themselves enacting their intensely felt engagement in the ongoing dream narrative (e.g., crying when awakening from a sad dream; Hypothesis 2). Assuming that such awakening dream enactment contributes to a lingering sense of the reality of dream events, the movement inhibition thresholds

also should predict how often dreamers experience their dreams as "real" even after awakening (Hypothesis 3). And, if OR-mediated discontinuities in dream imagery provide more intimate and intricate representations of the dreamer's felt engagement in the dream situation, the movement inhibition thresholds should predict how often individuals report dream-induced self-perceptual depth (e.g., increased sensitivity to feelings typically ignored; Hypothesis 4). Finally, since such self-perceptual depth through dreaming is probably but one instance of self-altering experiences through absorbing imagery, we expected that these movement inhibition thresholds—as well as the reports of self-perceptual depth through dreaming—would be associated with absorption (Tellegen, 1982), a widely used measure of openness to self-altering imaginal experiences (Hypothesis 5).

We initially examined these hypotheses in a series of three studies in which the dependent measures were assessed using questionnaire procedures. Since the differences between these studies were mostly minor variations in item selection, a summary of their designs will precede a cumulative report of the results.

## Method

### *Participants*

In Study 1, 105 introductory psychology students (50 men, 55 women, mean age 20.6 yrs.) completed the research procedures for course credit. In Study 2, 167 introductory psychology students (76 men, 91 women, mean age 21.8 yrs.) participated. In Study 3, 133 introductory psychology students participated, again for course credit (age and gender information for this sample was not available, although roughly comparable to Studies 1 and 2).

### *Procedure*

During class time, participants in all three studies were asked to complete a version of the Sleep/Dreams Questionnaire, followed by Tellegen's (1982) Absorption Scale. When finished, participants received a complete debriefing.

### *Sleep/Dreams Questionnaire*

The Sleep/Dreams Questionnaire (SDQ) (Appendix 1) was a modification of an instrument that has been used to assess patterns of sleeping and dreaming in previous studies (cf. Kuiken & Sikora, 1993). Responses to the SDQ indicate the frequency of certain events during the past year, ranging from 0 = "Never" to 5 = "Very often (one or more times per week)." From Study 1 to Study 3, slightly different wording for and combinations of items from the SDQ were used in the assessment of movement inhibition during wakefulness, movement inhibition during dreaming, dream enactment during awakening, a lingering sense of dream reality, and dream-induced self-perceptual depth, as follows.

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In all three studies, the threshold for movement inhibition during dreaming was assessed by asking: "During events within a dream, do you ever feel weak or unable to move?" On the other hand, assessment of the threshold for movement inhibition during wakefulness was varied. In Study 1, that threshold was assessed using a single item: "Do you ever feel weak or unable to move during daytime laughter, surprise, fear, or other strong emotions?" In Studies 2 and 3, an aggregate measure of that threshold was created by summing ratings for five items referring to different emotions (laughter, sadness, fear, anger, surprise; e.g., "During the day, how often do you feel weak or unable to move while experiencing intense surprise?").

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In all three studies, enactment of the dream during awakening was assessed by asking: "How often do you awaken to find yourself acting out your dream (e.g., crying during a sad dream, talking out loud during a dream in which someone is talking)?" On the other hand, assessment of the lingering sense of dream reality after awakening was varied. In Studies 1 and 2, that sense of reality was assessed using a single item: "How often do you have dreams with figures or events that still seem real after the dream is finished?" In Study 3, an aggregate measure of that sense of reality was created by summing ratings for three items referring to the dream self, other dream figures, and dream places and things (e.g., "How often have dream places or things seemed 'real' to you even after awakening?").

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In Studies 1 and 2, a 4-item scale was used to measure dream-induced self-perceptual depth. The items for this scale were identified previously in a factor analysis of SDQ items probing the effects of impactful dreams on subsequent waking thoughts, feelings, and activities (Kuiken and Sikora, 1993). Adaptations of this scale have been used to compare dream and fantasy reflection (Nielsen, Kuiken, & McGregor, 1989) and to compare existential dreams with other types of impactful dreams (Kuiken and Sikora, 1993; Busink & Kuiken, 1996). Items in this scale were: "How often have your dreams reminded you of events that occurred in your past?"; "How often after a dream have you felt more sensitive to aspects of your life that you typically ignore?"; "How often have you experienced dreams that make you feel like changing the way you live?"; and "How often have your dreams affected your mood even after you awaken?" In Study 3, the scale was modified slightly by replacing the single mood item with the average of three items reflective of different types of lingering dream affect (fear, sadness, and joy; e.g., "How often after awakening from a dream have you felt deeply saddened about life?").

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In Study 3, three questions were added to assess the reported frequency of the three impactful dream types identified by Kuiken and Sikora (1993) and Busink and Kuiken (1996). The occurrence of Existential Dreams was assessed by asking how often during the past year participants had experienced dreams that included all three of the following features: (a) a dream figure from whom the dreamer had been separated in real life (through death, divorce, etc.); (b) strong and clear feelings of sadness, guilt, or distress; and (c) awakening close to tears or actually crying. For Anxiety Dreams, the analogous criteria were: (a) a dangerous event or events (e.g., threatened or actual bodily harm, pursuit by threatening figures, etc.); (b) clear and strong feelings of fear; and (c) awakening with intense fear and a sense of impending doom. And, for Transcendent Dreams, the criteria were: (a) an

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astonishing event (e.g., a spiritual figure appeared, an inanimate object seemed alive, something magical happened, etc.); (b) feeling vital, energetic, and exceptionally alert; and (c) awakening to intense joy and ecstasy.

In order to minimize demand characteristics, the preceding SDQ items were masked by interspersing them among about 50 others concerning aspects of sleep and dreams unrelated to the hypotheses.

### *Tellegen Absorption Scale*

The Tellegen Absorption Scale (TAS) consists of 34 true/false items, such as "If I wish, I can imagine (or daydream) some things so vividly that they hold my attention as a good movie or story does" and "I can sometimes recollect certain past experiences in my life with such clarity and vividness that it is like living them again or almost so." Since the assessment of absorption can be affected by test circumstances and demand characteristics (Drake, Nash, & Cawood, 1991; Perlini, Lee, & Spanos, 1992), we prepared a masked version of the TAS that interspersed the 34 absorption items with 26 items selected at random from other subscales of the Multidimensional Personality Questionnaire (Tellegen, 1982). In Studies 1 and 2, this set of 60 items was administered, whereas in Study 3, participants completed the entire 300-item Multidimensional Personality Questionnaire.

### **Results**

In testing each of the hypotheses, we calculated partial correlations that statistically controlled for levels of dream recall. Dream recall was assessed by an SDQ item that read: "When you awaken and get up in the morning, how often do you recall a dream?" (0 = "Never" to 5 = "Very often, six or more times per week"). For results reported in the text, the following notation is used to indicate levels of significance: \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ , one-tailed, with alpha levels corrected using multi-stage Bonferroni procedures (Lazeler & Mulaik, 1977).

### *Hypotheses 1-4*

As expected (Hypothesis 1), we consistently found positive correlations between the frequency of self-reported movement inhibition after sudden emotional events during wakefulness and the frequency of reported movement inhibition during dreaming (see the columns describing results of Studies 1-3 in Table 1). This pattern provides evidence of cross-state stability in thresholds for OR-related movement inhibition.

Also, as expected (Hypothesis 2), indices of OR-related movement inhibition predicted the reported frequency with which participants awakened to find themselves enacting dream events. As indicated in Table 1, these correlations were obtained for movement inhibition during wakefulness and for movement inhibition during dreaming. These findings are consistent with the notion that low thresholds

Table 1. Correlations Between OR-Related Movement Inhibition, Dream Enactment, Dream Reality, and Self-Perceptual Depth

	Study 1	Study 2	Study 3	Study 4
Movement Inhibition During Wakefulness X Movement Inhibition During Dreaming	.35**	.49***	.35***	.36*
Movement Inhibition During Wakefulness X Dream Enactment During Awakening	.28**	.35***	.25**	.61***
Movement Inhibition During Dreaming X Dream Enactment During Awakening	.38***	.22**	.32***	.46**
Movement Inhibition During Wakefulness X Lingering Dream Reality	.23*	.25**	.38***	.18
Movement Inhibition During Dreaming X Lingering Dream Reality	.31**	.24**	.50***	.39*
Movement Inhibition During Wakefulness X Dream-Induced Self-Perceptual Depth	.38***	.47***	.45***	.50**
Movement Inhibition During Dreaming X Dream-Induced Self-Perceptual Depth	.35**	.37***	.44***	.55***

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ , one-tailed, with alpha levels corrected using multistage Bonferroni procedures.

for movement inhibition during dreaming, perhaps experienced as felt ineffectuality, mediate the emergence and intensification of dream feelings, as indicated by expressive awakening activity (e.g., crying when awakening from sad dreams).

Furthermore, both indices of OR-related movement inhibition predicted the reported frequency with which participants found that dream figures and events seemed real even after awakening (Hypothesis 3). Thus, as might be expected given the positive correlations between the frequency of dreams that end in enactment and the frequency of dreams that seem real afterwards (Study 1:  $r = .52^{***}$ ; Study 2:  $r = .27^{***}$ ; Study 3:  $r = .39^{***}$ ), individual thresholds for OR-related movement inhibition also predict how often dreams possess a reality that lingers even after awakening.

Of particular importance was confirmation that indices of OR-related movement inhibition were predictive of how often dreamers experienced dreams that precipitated self-perceptual depth (Hypothesis 4). Again, this result was obtained for movement inhibition during wakefulness and for movement inhibition during dreaming. Thus, consistent with findings that dream enactment is correlated with dream-induced self-perceptual depth (Study 1:  $r = .42^{***}$ ; Study 2:  $r = .22^{**}$ ; Study 3:  $r = .38^{***}$ ) and that lingering dream reality also is correlated with dream-induced self-perceptual depth (Study 1:  $r = .36^{**}$ ; Study 2:  $r = .19^{**}$ ; Study 3:  $r = .52^{***}$ ),

the present data indicate that individual thresholds for OR-related movement inhibition predict all three dream effects: dream enactment, lingering dream reality, and increased self-perceptual depth.

### *Hypothesis 5*

We attempted to locate the individual thresholds for OR-related movement inhibition within the personality domain in two ways. First, in Studies 1-3, we found that the TAS was positively correlated with individual thresholds for movement inhibition during wakefulness and during dreaming (Hypothesis 5), as well as with dream enactment, lingering dream reality, and dream-induced self-perceptual depth (see Table 2). Second, factor analysis of the set of personality dimensions measured in Study 3 confirmed that individual thresholds for OR-related movement inhibition were most closely associated with the absorption variable. Specifically, the eleven dimensions of the Multidimensional Personality Questionnaire were included in a factor analysis (principal components, equamax rotation) with both measures of OR-related movement inhibition. As shown in Table 3, of the five factors extracted (accounting for 68.4% of the total variance), the first included absorption, movement inhibition during wakefulness, and movement inhibition during dreaming (as well as a personality scale measuring stress, i.e., nervousness, vulnerability, easily upset, etc.). The movement inhibition thresholds did not significantly load on any of the other four factors. Thus, individual thresholds for OR-related movement inhibition are associated with absorption, a personality dimension that has been identified with openness to experience (Wild, Kuiken, & Schopflocher, 1995).

**Table 2.** Correlations Between Absorption (TAS) and OR-Related Movement Inhibition, Dream Enactment, Dream Reality, and Self-Perceptual Depth

	Study 1	Study 2	Study 3	Study 4
Movement Inhibition During Wakefulness	.29**	.34***	.45***	.28*
Movement Inhibition During Dreaming	.19*	.17*	.14*	.37*
Dream Enactment During Awakening	.32**	.18*	.41***	.38*
Lingering Dream Reality	.22*	.29***	.44***	.31*
Dream-Induced Self-Perceptual Depth	.53***	.46***	.50***	.41*

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ , one-tailed, with alpha levels corrected using multi-stage Bonferroni procedures.



Table III. Factor Loadings for Measures of OR-Related Movement Inhibition and Scales from the Multidimensional Personality Questionnaire (Tellegen, 1982)

	I	II	III	IV	V
Waking Mov Inhib	<u>0.809</u>	0.068	-0.031	-0.066	0.017
Dream Mov Inhib	<u>0.616</u>	-0.048	-0.005	-0.124	0.014
Absorption	<u>0.792</u>	-0.040	0.048	0.144	0.190
Stress Reaction	<u>0.634</u>	0.146	<u>0.490</u>	-0.067	0.051
Traditionalism	0.019	<u>0.838</u>	-0.072	0.008	0.045
Harmavoidance	0.161	<u>0.664</u>	0.026	-0.184	<u>-0.412</u>
Control	-0.222	<u>0.622</u>	0.046	0.327	-0.332
Social Closeness	-0.007	<u>0.031</u>	<u>-0.816</u>	-0.201	-0.026
Wellbeing	0.021	0.085	<u>-0.785</u>	0.027	0.149
Achievement	-0.004	0.025	0.009	<u>0.929</u>	0.012
Aggression	0.017	-0.242	0.027	-0.089	<u>0.801</u>
Social Potency	0.098	-0.146	-0.360	0.328	<u>0.706</u>
Alienation	0.237	0.296	<u>0.497</u>	-0.223	<u>0.567</u>

#### Auxiliary Findings

When absorption, movement inhibition during wakefulness, and movement inhibition during dreaming were entered as independent variables into a regression equation, absorption (*std. coeff.* = .39\*\*), movement inhibition during dreaming (*std. coeff.* = .32\*\*), and movement inhibition during wakefulness (*std. coeff.* = .22\*\*) independently contributed to prediction of dream-induced self-perceptual depth ( $R = .70$ ,  $F(3,126) = 40.54$ ,  $p < .001$ ). This pattern indicates that, although located in the absorption personality domain, the movement inhibition indices reflect an aspect of that domain that is not captured by the TAS and that may separately contribute to our understanding of how dreams sometimes induce self-perceptual depth.

Although dream-induced self-perceptual depth is more closely associated with the occurrence of Existential Dreams ( $r = .40^{***}$ ) than with the occurrence of either Anxiety Dreams ( $r = .25^{**}$ ) or Transcendent Dreams ( $r = .22^{**}$ ), the absorption dimension is relatively but not *distinctively* predictive of Existential Dreams. When factor scores were entered into regression equations to predict the occurrence of each of the three types of impactful dreams, Factor I (Absorption, Stress, Movement Inhibition) predicted the occurrence of Existential Dreams (*std. coeff.* = .40\*\*\*), Anxiety Dreams (*std. coeff.* = .33\*\*\*), and Transcendent Dreams (*std. coeff.* = .21\*\*). On the other hand, Factor IV (Achievement) *distinctively* contributed to prediction of Existential Dreams (*std. coeff.* = -.24\*\*). Consistent with the themes of ineffectuality that characterize existential dreaming, the *absence* of an achievement orientation (working hard, enjoying demanding projects, persistence) seems associated with the occurrence of this dream type. Also, Factor V (Aggression, Social Potency, and Alienation) was inversely related to the occurrence of Anxiety Dreams (*std. coeff.* = -.16,  $p < .07$ ) but directly related to the frequency of Transcendent Dreams (*std. coeff.* = .21\*). Apparently the *presence* of an aggressively forceful sense of being mistreated seems associated with Transcendent Dreams, whereas the *absence* of that disposition is associated with Anxiety Dreams.

## Discussion

Studies 1-3 confirm that individual thresholds for OR-related movement inhibition are stable across waking and dreaming states (Hypothesis 1). Moreover, results are compatible with a model within which low thresholds for OR-related movement inhibition during dreaming precipitate a level of felt engagement that results in dream enactment during awakening (Hypothesis 2), a heightened sense of the reality of dream events after awakening (Hypothesis 3), and dream-induced self-perceptual depth (Hypothesis 4). As observed in previous studies (Kuiken & Sikora, 1993; Busink & Kuiken, 1996), dream-induced self-perceptual depth seems more closely associated with existential dreams than with either transcendent or anxiety dreams.

Moreover, the present findings suggest that individual thresholds for OR-related movement inhibition can be located in the absorption personality domain (Hypothesis 5). However, although absorption strongly predicted dream-induced self-perceptual depth, other personality factors seem required to differentially predict the three types of impactful dreams. The absence of an achievement orientation was associated with existential dreams, consistent with their characteristic feelings of ineffectuality. Also, this pattern is consistent with recent findings suggesting that existential dreams are relatively frequent among people experiencing depression during bereavement (Kuiken, 1993). Perhaps sadness and distress following a loss shape reactions to OR-mediated ineffectuality, emotionally underlining their deeply personal implications.

## A DIARY STUDY

Studies 1-3 were limited by reliance on retrospective accounts of the frequency of movement inhibition during wakefulness, of movement inhibition during dreaming, and of other dream phenomena. Almost certainly, memory limitations precluded precise assessment of the hypothesized relationships. Therefore, we attempted to replicate those findings in a setting that provided more immediate recollection and description of movement inhibition during dreaming and of other dream events. In Study 4, dream diaries maintained daily were used to assess the dream characteristics and dream effects referred to in Hypotheses 1-5 (as described above).

## Method

### *Participants*

Participants in Study 4 were derived from two separate but compatible samples. For one sample, 24 introductory psychology students, each of whom recalled at least three dreams per week, participated for course credit (age and gender information were not available). For a second sample, volunteers who responded to notices placed on various campus bulletin boards and who reported that they recalled

three or more dreams per week were screened to exclude anyone currently in counseling or therapy. The result was a sample of 28 young adults (10 men, 18 women, mean age 26.0 yrs.) who completed research participation for payment. These two groups were combined to create a sample of 52 young adults with fairly high levels of dream recall.

### *Procedures*

During class time, the introductory psychology students completed the SDQ and the 60-item TAS. The volunteers completed these same questionnaires during an initial laboratory session. In their homes, participants from both samples recorded their dreams daily during a 14-day period. On each day, they completed the Diary Questionnaire (DQ), (Appendix 2) which included two sections, one requesting description of any dream they recalled from the preceding night and another requesting description of any effects of that dream on thoughts and feelings after awakening. The introductory psychology students completed both parts of the questionnaire as soon as possible after awakening. The volunteers completed the dream description section immediately after awakening and the dream effects section just before bedtime the following evening. Because the pattern of results was essentially the same for both samples, only the combined results will be presented.

### *Sleep/Dreams Questionnaire*

In this study, the SDQ was used to assess only the threshold for OR-related movement inhibition during wakefulness. For the introductory psychology students, that threshold was assessed using a single item, as in Study 1. For the volunteers, an aggregate measure of that threshold was created, as in Studies 2 and 3. Because results in both samples were generally congruent, the single rating for the students and the average of five ratings for the volunteers were treated as equivalent in the present report.

### *Diary Questionnaire*

Questions on the DQ were identical for all participants. The DQ began by asking whether the participant remembered a dream (i.e., "imagery of some action or events") from the preceding night. If a dream was recalled, participants completed the remainder of the questionnaire, which included the same items used in Study 2 to measure weakness or inability to move within the dream, dream enactment during awakening, the sense of dream reality after awakening, and dream-induced self-perceptual depth. However, in this study, all items were rated on a 5-point scale for the extent to which they were true of the reported dream event ("1 = not at all" to "5 = extremely"). For each participant, aggregate measures for each item were created by determining the average rating across all dreams

recalled. Where appropriate (e.g., when measuring self-perceptual depth), these averages were then summed to create scale scores.

### *Tellegen Absorption Scale*

The TAS was administered as part of the same 60-item questionnaire used in Studies 1 and 2.

## Results

As indicated in the rightmost column of Table 1, results consistently replicated those of Studies 1-3. First, the frequency of movement inhibition after sudden emotional events during wakefulness was positively correlated with the amount of reported movement inhibition during dreaming (Hypothesis 1). Second, both indices of OR-related movement inhibition predicted the extent of dream enactment during awakening (Hypothesis 2). Third, movement inhibition during wakefulness was positively but *not reliably* correlated with the extent to which dreams seemed real after awakening, although movement inhibition during dreaming was positively and *reliably* correlated with persistent dream reality (Hypothesis 3). (Note: Waking dream enactment and a lingering sense of dream reality were positively correlated [ $r = .50^{**}$ ].) Fourth, both indices of OR-related movement inhibition were correlated with the extent to which reported dreams induced self-perceptual depth (Hypothesis 4). (Note: Dream-induced self-perceptual depth was associated with waking dream enactment [ $r = .58^{***}$ ] and with lingering dream reality [ $r = .46^{**}$ ].) Finally, as indicated in Table 2, the TAS was positively correlated with both indices of OR-related movement inhibition, as well as with dream enactment, lingering dream reality, and dream induced self-perceptual depth.

## Discussion

The present dream diary study strongly confirmed the results of the previous questionnaire studies. With one exception, the observed relationships were comparable to or slightly more robust than those observed in Studies 1-3. The slight predictive enhancement may have been due to the advantages of immediate dream recall or to the relative stability of measures aggregated across a participant's dream series.

Moreover, two factors that might have been expected to diminish the observed relationships apparently did not. First, in Studies 1-3, the SDQ and TAS were administered in a single session and in a similar questionnaire format; consequently, the reported correlations may have been inflated by shared method variance. In contrast, in Study 4, the combination of questionnaire and diary procedures provided *some* methodological diversity, which might have been expected to lower the reported correlations. Although such attenuation did not occur, we cannot com-

pletely discount the possibility that shared method variance influenced the results since self-report procedures were used in all four studies.

Second, in Studies 1-3, the administration of the SDQ and the TAS within a single session may have accentuated demand characteristics and enlarged the reported correlations. For example, answering certain questions affirmatively (e.g., indicating ineffectuality in dreams) may have motivated participants to answer subsequent questions in a manner that was "expected" (e.g., by indicating that dreams influence mood). By separating administration of the SDQ and TAS from daily completion of the DQ in Study 4, these implicit demands may have lost some of their force. And yet, the relationships that might have been diminished in these circumstances (e.g., the correlation between absorption and dream-induced self-perceptual depth) apparently were not. Perhaps the demand characteristics of these studies had already been minimized by the inclusion of numerous items masking the purposes of the SDQ, DQ, and TAS.

### GENERAL DISCUSSION

The present series of studies provided consistent evidence of a relationship between movement inhibition after sudden emotional events during wakefulness and movement inhibition during dreaming (Hypothesis 1). These results suggest a psychobiological predisposition that is stable across states, rather than specific to sleep. In future studies, this predisposition might be measured more directly. For example, either during REM sleep or after sudden emotional stimuli during wakefulness, individuals with low thresholds for OR-related movement inhibition may manifest intensified or prolonged EMG suppression or H-reflex inhibition. Correspondence between such electrophysiological indices and the self-report measures of OR-related movement inhibition would provide useful substantiation of the psychobiological hypotheses tested here.

But even the preliminary indices used in the present studies substantiate the proposal (Kuiken, 1995) that, in existential dreams, OR-related movement inhibition during REM sleep is experienced as weakness, fatigue, ineffectual movement, and a sense of personal limitations. The evidence also suggests that the emotional feelings emerging in response to such ineffectuality become sufficiently intense that the dreamer may find herself enacting—perhaps in muted form—the actions and feelings present during the dream ending (Hypothesis 2). Moreover, the evidence is compatible with the notion (cf. Nielsen, 1991) that such enactment contributes to a lingering sense of these dreams' "reality" (Hypothesis 3). In sum, among individuals who have low thresholds for OR-related movement inhibition, awakening from dreams is more likely to entail an intense and compelling sense of engagement in a vivid dream reality. That such dreams would penetrate and influence subsequent waking activities seems understandable.

That certain dreams provide a compelling sense of engagement in a vivid dream reality seems necessary but insufficient to explain dream-induced self-perceptual depth—at least as measured here. Self-perceptual depth *also* reflects personal realizations (e.g., "After my dream, I felt sensitive to aspects of my life that

I typically ignore”) and readiness for change (e.g., “After my dream, I felt like changing the way I live”). Kuiken (1995) suggested that OR-mediated discontinuities and related transformations of dream meanings provide the novelty, intimacy, and intricacy of self-representation that is experienced as self-perceptual depth. While that formulation is compatible with the observation that OR-related movement inhibition is associated with questionnaire reports of self-perceptual depth (Hypothesis 4), the present studies did not *directly* assess such self-perceptual novelty, intimacy, and intricacy in participants’ actual dream narratives. There is evidence that discontinuities in a dream narrative typically are followed by events that are conceptual neighbors of those preceding the discontinuity (cf. Rittenhouse, Stickgold, & Hobson, 1994). Thus, what is novel in the subsequent event pattern is only partly new, a variation on an “old” theme. Direct study of such dream transformations is needed. From the present studies, we would expect that transformations providing relatively novel, intimate, and intricate event patterns will frequently emerge in the dreams of individuals with low thresholds for OR-related movement inhibition.

As suggested by the correlations with absorption (see Table 2), the present studies describe individual differences in OR activity and dreaming patterns that have *trait*-like stability. However, it also would be useful to examine the day-to-day *state* changes that immediately determine when persons with generally low thresholds for OR-related movement inhibition experience dream-induced self-perceptual depth. For example, among such predisposed individuals, an emotional presleep event (e.g., an intensely sad parting) may be the immediate precursor of an existential dream. Carefully designed life event and dream diary studies may help to identify the complex of factors that converge to produce such impactful dreams. Identification of the relevant person characteristics (e.g., low thresholds for OR-related movement inhibition) will almost certainly increase the utility of such investigations.

Studies 1-4 located individual differences in thresholds for OR-related inhibition—and the related dream effects—in the same personality domain as absorption, a personality dimension that originally was introduced as the tendency to become fully involved in “self-altering” experiences (Tellegen & Atkinson, 1974). However, Study 3 indicated that indices of OR-related movement inhibition contributed to prediction of dream-induced self-perceptual depth *independently* of the TAS. Thus, absorption *per se*, at least as currently measured, seems insufficient to clarify the origins of such self-altering experiences as existential dreams. Instead, we may need to develop instruments that more directly reflect individual differences in the tendency toward novelty, intimacy, and intricacy in self-perceptual imagery. To develop such instruments—and to refine our explanation for the relationships observed here—it may be most fruitful to focus on traits factorially related to absorption.

Other findings from Study 3 confirm previous evidence that, although existential dreams more frequently facilitate self-perceptual depth than other types of impactful dreams, they are not unique in that regard. One possibility, proposed by Kuiken and Sikora (1993), is that OR-mediated transformations are more likely to focus on distressing feelings in existential dreams, on threatening figures in anxiety dreams, and on fundamental visuo-spatial orientations in transcendent dreams.

Their account suggested that the differences between impactful dream types depend upon which component of the OR is most prominent. In existential dreams, for example, the movement inhibition component is likely to evoke a related movement quality (e.g., ineffectuality), related feelings (e.g., the sagging and fatigue of discouragement), and OR-mediated transformation of those feelings, especially during the dream ending.

Another possibility, suggested by the results from Study 3, is that differences between impactful dream types depend upon contrasting personality profiles that shape responses to dream ineffectuality. The pattern obtained there is reminiscent of the distinction between self/ideal and self/ought discrepancies introduced by Higgins (1987). Existential dreams may occur among people with a low or declining interest in achievement, such as is associated with depression, because for them ineffectual movement is reminiscent of failures to attain their personal ideals—and therefore evocative of sadness, discouragement, and dissatisfaction. In contrast, anxiety dreams may occur among people for whom ineffectual movement is reminiscent of their inability to assertively contend with social obligations or responsibilities—and therefore evocative of anxiety, worry, and fear. In this view, the self-perceptual depth associated with existential dreaming may be another indication that individuals who are depressed in reaction to life events sometimes think—and perhaps dream—in ways that reflect certain forms of discerning self-perception. There is evidence that, in some circumstances, depressed people are less likely to attribute responsibility for failure to others, more likely to attend to social cues, more likely to try to improve on their judgments, and so on (cf. Sinclair & Mark, 1992). Perhaps, by accentuating ineffectuality and sadness, existential dreams become manifestations of these harbingers of self-perceptual depth. Given reports that existential dreams influence waking thoughts and feelings not only for minutes or hours, but sometimes for months and years, these possibilities seem worthy of close examination.

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#### APPENDIX 1: SLEEP/DREAMS QUESTIONNAIRE ITEMS

The following items, adapted from Morrison and Dinges (1986), were used to measure the threshold for movement inhibition during wakefulness. They are presented here in the form judged by the authors as most appropriate for further research use (and as used in Studies 3 and 4). Means and standard deviations from Study 4 are also provided.



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The Sleep/Dreams Questionnaire rating scale:

- 0 = Never during the past year  
 1 = Rarely (one time during the past year)  
 2 = Occasionally (two or three times during the past year)  
 3 = Frequently (four to ten times during the past year)  
 4 = Often (one to four times per month)  
 5 = Very often (one or more times per week)

Item	Mean	SD
During the day, how often do you feel weak or unable to move while laughing?	0.70	1.27
During the day, how often do you feel weak or unable to move while experiencing intense sadness?	0.74	1.16
During the day, how often do you feel weak or unable to move while experiencing intense anger?	0.26	0.66
During the day, how often do you feel weak or unable to move while experiencing intense surprise?	0.41	0.69
During the day, how often do you feel weak or unable to move while experiencing intense fear?	0.78	1.05

## APPENDIX 2: DIARY QUESTIONNAIRE ITEMS

The following items were used to measure (a) the threshold for movement inhibition during dreaming, (b) dream enactment during awaking, (c) dream "reality" after awakening, and (d) dream-induced self-perceptual depth. They are presented here in the form judged by the authors as most appropriate for further research use (and as used in Study 4). Each item was rated on a 5-point scale for the extent to which it was true of the reported dream event ("1 = not at all" to "5 = extremely"). Means and standard deviations are from Study 4.

Item	Mean	SD
(a) In your dream, did you ever feel weak or unable to move?	1.22	0.81
(b) When you awakened, were you acting out some aspect of your dream (e.g., crying during a sad dream, talking out loud during a dream in which someone was talking)?	1.19	0.75
(c) To what extent did features of your dream (including your bodily self, other beings, places, and non-living things) seem real even after you first awakened?	2.17	1.52
(d) After my dream, I was sensitive to aspects of my life that I typically ignore.	1.29	0.79
(e) After my dream, I felt like changing the way I live in some way.	1.30	0.86
(f) After my dream, I was reminded of events from my past.	1.67	1.29
(g) At times during the day, my dream influenced my mood.	1.23	0.70