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A SELF-OBSERVATIONAL STUDY OF SPONTANEOUS HYPNAGOGIC IMAGERY USING THE UPRIGHT NAPPING PROCEDURE*

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ABSTRACT

Upright Napping is a procedure for observing and recording spontaneous hypnagogic imagery. It employs systematic self-observation and recording of imagery that occurs when one falls asleep in an upright seated position. Seventy-one hypnagogic images collected by the author over twenty-nine napping sessions were assessed for occurrence of illusory movements of the self and of other characters, for accompanying phasic and tonic neuromuscular events (NMEs), for isomorphic matches between illusory movements and NMEs, and for speaking and falling themes. The images were also subjected to an introspective analysis. Evidence was found for two types of illusory movement imagery and a distinctive progression in the quality of images as sleep ensues. With further trials and refinements, Upright Napping may prove to be a useful tool for investigating both the diversity and the microgenesis of dreamlike hypnagogic images.

Salvador Dali once described a method which permitted him to harness the creative power of his hypnagogic images [1]. He dozed off to sleep with a spoon in his hand positioned above a metal plate. When the muscle weakness of hypnagogic sleep came upon him, the spoon dropped into the plate and awakened him. He claimed that between the time the spoon left his hand to the time it awakened him, he had experienced a wealth of spontaneous, surrealistic imagery.

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Such imagery is now widely recognized to be characteristic of the surrealistic school.

Although the present work is not intended to directly evaluate Dali's bold claim, it is meant to demonstrate a similar self-observational procedure for accessing spontaneous hypnagogic images. This procedure—entitled Upright Napping—will demonstrate that ample dreamlike imagery can occur during the very brief transitions that lead to daytime naps, and that this imagery can be systematically recorded and assessed in relation to accompanying neuromuscular events.

There is, in fact, a long tradition of systematic self-observation in the study of hypnagogic imagery [e.g., 2-4]. One of the most widely cited is the report by the psychoanalyst Silberer, who noticed symbolic regularities between his pre-sleep thoughts and the hypnagogic images that followed [4, 5]. However, with the advent of sleep laboratory technologies for studying dream content, the tradition of self-observation seems to have waned in popularity [see 6, 7 for reviews].

In applying a method of systematic self-observation, an investigator decides beforehand to systematically record and scrutinize the hypnagogic images that occur under a given set of conditions. Such a method has some advantages over both reports of spontaneously occurring images and reports derived from laboratory studies. First, a planned self-observation by a trained observer can enhance the validity of an imagery report. Self-observation can facilitate the accurate reporting of details that would otherwise be lost. Hypnagogic imagery in general is difficult to recall if it is not reviewed and recorded immediately after its occurrence [6]. Recall can be enhanced if an image is brief and the observer remains relatively close to consciousness. Second, with repeated trials the introspective skills of an observer can be refined, permitting a focus upon increasingly specific microstructural details of the image. Third, systematic self-observation can provide a representative sample of one person's hypnagogic imagery. Spontaneous reports that are unsystematically recalled and recorded are likely to be those which are salient or exceptional in some way, and thus unrepresentative. Finally, systematic self-reporting can be performed in a "field" situation. Individuals can observe their images in a private setting without elaborate technologies for inducing the hypnagogic state. This aspect of systematic self-observation of hypnagogic images is, in fact, equivalent to the systematic reporting of dreams in home diaries in more traditional dream content studies. Together, the enhanced detail, representativeness, heuristic value, and ease of use of systematic self-observation suggests that it may be useful for in-depth analyses of this particularly elusive genre of imagery.

There have been relatively few laboratory studies of hypnagogic imagery. The most carefully controlled studies provide strong evidence that hypnagogic imagery is, in many respects, as dreamlike as imagery sampled from periods of REM sleep [8-11]. Specifically, these studies indicate that hypnagogic imagery is well-organized like REM imagery, and contains displacement, condensation, and regressive content. It also possesses dreamlike continuity like REM imagery.

Self-observational methods could prove valuable in furthering research into this question of hypnagogic imagery's similarity to REM dreaming.

The primary goals of the present work are to introduce a new self-observational method of imagery collection, to describe the kinds of images it produces, and to illustrate the types of analyses that may be performed. In the present article, the focus is on illusory movement in hypnagogic imagery and relationships between illusory movement and the neuromuscular events (NMEs) such as neck atonia and hypnic leg jerks that may accompany it. The data presented are necessarily limited in their generality because they are based upon images collected by the author during development of the procedure; but they nevertheless constitute a body of introspective findings worthy of comparison with previous self-observational attempts in this domain. The results will also suggest several hypotheses which could be explored further with a wider range of subjects and experimental methods.

METHODS

The basic steps of the Upright Napping procedure are listed in Table 1. In the present study, the procedure was initiated only during spontaneous periods of drowsiness that occurred during normal work hours. The tendency to fall asleep was allowed to ensue while an upright seated position was maintained. During the transition to sleep, an effort was made to observe details of imaginal mental activity until a clear hypnagogic image entered consciousness and an awakening from the revery occurred.

Thoughts and real perceptions were not of interest during these introspections, though faint illusory impressions were noted in passing where possible. The final awakening was provoked either by an aspect of the image itself, such as its suddenness of presentation, or by a phasic NME, such as an abrupt loss in neck muscle tone or a sudden muscle jerk. The upright posture assured that in every case the sleep onset period would never progress beyond the onset of muscle atonia, because the atonia itself would always produce an awakening body

Table 1. Steps of the Upright Napping Procedure

Step	Procedure
1.	Perform normal work sitting upright in a chair.
2.	When drowsy, close eyes and await a nap.
3.	Observe all imagery during transition to sleep.
4.	On awakening, review preceding imagery and neuromuscular events.
5.	Record details immediately.
6.	Repeat from step 2.

movement. Although in many cases it appeared to be some feature of the imagery alone that provoked the awakening and not the drop in muscle tone, this impression is best left as a hypothesis until measurements of more subtle orienting responses are realized.

Once an awakening occurred, the image and any accompanying NME were immediately reviewed in detail. In some cases the report was then transcribed into a text processor which was left running at all times; in other cases, one or more additional images were recalled before they were transcribed. The latter variation may have sacrificed some details of images recalled near the beginning of a session, but it succeeded in preserving the drowsy state and permitting the capture of several hypnagogic images in a short period of time. All typed information was dated and archived on computer disk for later analyses.

In the present study, all reports collected during the eighteen-month period between September, 1989 and March, 1991 were printed. The reports were scored independently by the author and one other judge for the following attributes:

1. The type of illusory movement in the image (performed by Self, by an Other character, by Both, by Neither).
2. The presence and bodily location (head, leg, arm, whole body) of phasic and tonic neuromuscular events upon awakening. Phasic NMEs consisted of head nods and limb and whole body jerks. Tonic events consisted of feelings of parasthesiae ("pins and needles") or noticeable pressure in a body part.
3. Whether the illusory movement matched or did not match the NME associated with the awakening. A match was defined as a strong similarity in the bodily location and specificity of the illusory movement and the NME.
4. Whether the imagery contained speaking or falling content. Speaking was defined as any instance of a verbal sound; falling was defined as any instance of postural or object imbalance.

Both statistical and introspective analyses were performed on the reports. For the statistical analyses, frequencies of dichotomous categories were evaluated by *z*-score approximations of their similarity to the standard normal distribution [12]. The introspective analysis was conducted at the end of the collection period. Reports were reviewed several times by the author to assess potential regularities in the content of the images; such regularities were then framed as hypotheses about imagery structure which could be used as part of the preparatory set for subsequent observations. Approximately thirty subsequent observations were conducted to assess the veridicality of these hypotheses. Based upon this analysis, some unanticipated categories were identified and a description of the general progression of hypnagogic imagery attempted.

RESULTS

Statistical Analyses

Kappa reliability coefficients for the two judges' scores were highly significant for all features scored: Illusory Movement Type (.66), NME Type (.95), Illusory Movement-NME Matches (.83), and Speaking (.93) and Falling (.63) themes. The author's scores were used for the final statistical analyses.

The procedure produced samples of vivid hypnagogic imagery which were distributed across an eleven-hour span from 10:00 a.m. to 9:00 p.m. However, most of the images occurred during the mid-to-late afternoon (mean: 4:02 p.m., *sd*: 2:54). A total of seventy-one images were collected from twenty-nine separate sessions. A mean of 2.45 images was recorded per session (*sd*: 1.62; range: 1-7). Although unproductive sessions were not systematically recorded, they were relatively scarce, occurring in under 10 percent of the trials. These were typically sessions interrupted by telephone calls, visitors, etcetera.

All images except one (1.3%) were rated as containing illusory movement by either Self, Other or Both characters. Further, evidence for two qualitatively different kinds of imagery was found. Illusory movement was equally likely to be by the Self character (43.7%) or an Other character alone (43.7%), while illusory movements were only rarely by Both self and other characters (11.3%).

Phasic NMEs occurred in a total of thirty-nine of the seventy images that contained illusory movements (56.7%; Table 2), and were more frequent for head nods (56.4%) than for leg jerks (23.1%), arm jerks (15.4%), or whole body jerks (5.1%). Tonic NMEs occurred in a total of eighteen of seventy images (25.7%).

The two imagery types were found to be differentially associated with these phasic and tonic physiological events. For images with illusory Self movement, a phasic NME was more than twice as likely to be present (21/31 or 67.7%) than to be absent ($z = 1.98$, $p = .024$). For illusory Other movements (12/31 or 38.8%), the opposite trend was found ($z = -1.26$, $p = .104$; Figure 1). Imagery with movement by Both self and other characters (6/8 or 75.0%) showed a trend similar to that for

Table 2. Types of Phasic Neuromuscular Events (NMEs) Reported

Neuromuscular Event	*n*	%
Head	22	56.4
Leg	9	23.1
Hand/arm/shoulder	6	15.4
General	2	5.1
Total	39	100.0

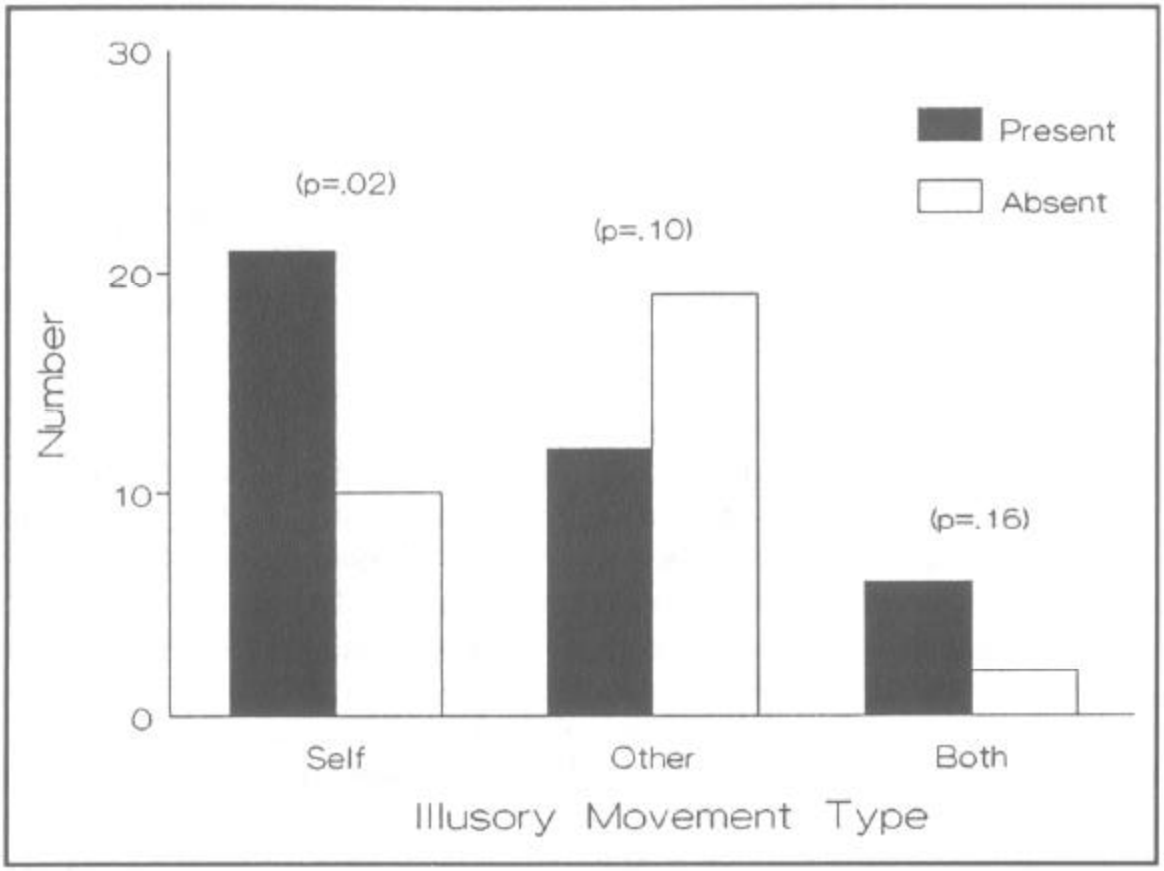

Figure 1. Frequency of illusory movements when phasic NME is present or absent (n = 70).

imagery with movement by the Self character alone (z = 1.00, p = .16). Tonic events were also more frequently associated with illusory Self (11/31 or 35.5%) than Other movements (6/31 or 19.4%), a marginal difference (z = 1.24, p = .11).

The two imagery types were also differentially associated with other rated content categories (Table 3). Illusory Self movements were associated mainly with falling themes (z = 1.50, p = 0.07), whereas illusory Other movements were associated mainly with Speaking themes (z = -2.18, p = .015).

Of the thirty-seven reports in which a specific phasic NME occurred in conjunction with an illusory movement (the two images for which a whole body jerk occurred were excluded), the illusory movement was found to match the phasic NME in sixteen and not to match the phasic NME in twenty one. This was a statistically nonsignificant difference. However, when the same associations were examined separately for head nods and limb jerks, differences were found (Figure 2). Specifically, only four of twenty two (18.2%) illusory movements matched the head nods (z = -2.99, p = .001), while twelve of fifteen (80.0%) illusory movements matched the limb jerks (z = 2.32, p = .010). The following is an example of a very precise co-occurrence of an illusory Self movement with a phasic leg jerk:

I was standing at the top of a set of stairs. I had spilled some brightly colored candies all around me on the floor and down the stairs. I reached out behind me with my right foot and swept one of the candies down the stairs with my toes. On awakening, my right thigh muscles jerked slightly without displacing my leg.

Table 3. Number of Images with Speaking and Falling Themes

	Speaking		Falling	
	n	%	*n*	%
Self	4	(23.5)	11	(68.7)
Other	13	(76.5)	5	(31.3)
Total	17	(100.0)	16	(100.0)
	(p = .02)		(p = .07)	

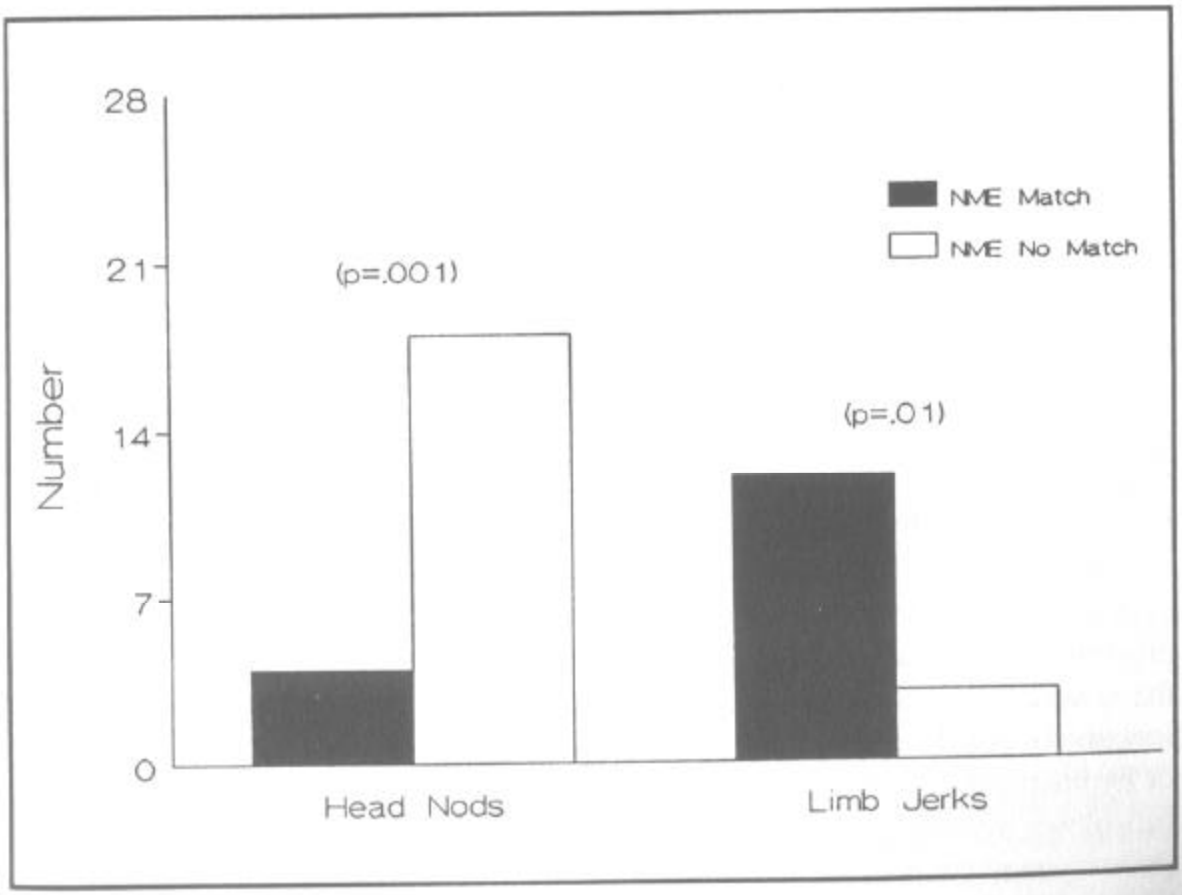

Figure 2. Correspondence between phasic NME types and illusory movement (n = 37).

Introspective Analyses

Upon review of the images collected during Upright Napping, three unanticipated regularities in imagery content became apparent. The most prominent of these occurred in eleven images (15.5%) and was termed Self-Other confusion. In these images, the illusory movement of an other character seemed to involve the self, often as a compelling sense of vicarious participation in the other character's movement without actual visual representation of it. It is as if the narrator perspective suddenly shifted from other to self or vice versa on the basis of some subtle movement feature. These confusions were typically difficult to describe in words, although one of the more explicit examples follows: "I am watching someone else walking. Then it is as if I was walking and I find myself about to start quickly up some stairs. I awaken with a very strong leg jerk."

A second unexpected regularity consisted of images with illusory movements that corresponded temporally with an NME but did not match its bodily location. Often the trajectory of the illusory movement was in opposition to the real body movement. Two examples:

> Someone in front of me is doubled over toward me, praying. Someone else reaches around from behind this person and quickly lifts him into an upright position. At the same time I feel my head nodding slightly forward and it awakens me.

> I was in the process of lifting a large cup of tea up to my lips with my right hand. I awoke as my head was dropping slightly forward.

A third unexpected category consisted of images in which a sudden shift in the orientation of the Self character to the hallucinated scene occurred. These occurred in five of the seventy-one images reviewed (7%). An example: "A black man in an entrance pushes open the outside door and goes out. My attention shifts fairly abruptly to a real space on my immediate left. I wake up just after this shift has occurred and feel a slight sense of vertigo."

Certain regularities in the overall progression of experience occurring between eyes closed and abrupt awakening could be discerned after several trials with the procedure had been completed. This progression seemed to characterize most of the sessions containing hypnagogic images, and it will therefore be presented tentatively as a description of the fundamental structure of the author's experience of hypnagogia. The progression proceeds linearly with respect to the onset of a full-blown hypnagogic image. However, the sequence defined by Parts 2, 3, and 4 (below) contains features which recur in miniature during the period of "fleeting impressions" in Part 1. "Phenomenal Silence," for instance, is a quality that to some extent characterizes the onset of both a fleeting visual impression and an hallucinatory hypnagogic image.

1. Fleeting Impressions

Soon after closing the eyes, a variety of very brief sleepiness feelings and fleeting impressions of visual and kinesthetic imagery arise. These feelings and impressions are spatially localized in particular regions of the body, usually the chest and head, or in an "apparent space" which is phenomenally different from that of the body. Each such feeling and impression seems to be associated with an equally brief or partial lapse of awareness which precedes it (see Part 2 below). Apart from these lapses, however, awareness of the surroundings is relatively intact and the processes can be scrutinized and recalled while the stage unfolds. It may be this stage in particular which has contributed to the notion that hypnagogic images are fleeting or half-formed in character.[1]

2. Phenomenal Silence

The period immediately preceding onset of a hypnagogic image is best described as a transition period of "phenomenal silence." This and the two following parts form an integral unit. None of them can be scrutinized while they happen, only after awakening from the hypnagogic image itself. Phenomenal silence consists of a lapse of awareness similar to, but more comprehensive than, the brief lapses identified in Part 1. It leaves a residual impression that attention had lapsed for an indeterminate period sometime before the onset of the hypnagogic image. It is very brief, and likely corresponds to an episode of micro-sleep. It appears as a silent background against which the hypnagogic scenario abruptly appears. It has the character of conscious control being relinquished briefly and an autonomous hypnagogic image asserting itself in its place. This transition may be one basis of the suggestion that hypnagogic images have a quality of "suddenness" or "intrusiveness" [e.g., 3].

3. Pre-image Context

The pre-image context of the sequence is also accessible to self-observation only after arousal from the image proper. It consists of an impression that some other hallucinatory event had already occurred before the hypnagogic image but after the period of phenomenal silence, and that this event cannot be remembered. For this reason, it is referred to as imagery context and not imagery per se. It may

[1] An ongoing study which is focused exclusively on this stage of the hypnagogic sequence supports this contention to some extent. Preliminary examination of thirty-five reports suggests that the images are similar in some ways to those in later stages and different from them in others. Similar to the later hypnagogic images, they possess apparent movement and rudimentary, recognizable visual structure. Unlike the later images, they frequently lack clear hallucinatory complexity, i.e., the simultaneous occurrence of an illusory character, scene, activity, etc. They thus correspond in some respects to the "waves of pure colors and light-charged clouds" and the "patterns and geometrical designs" emphasized by Mavromatis [7], Schacter [6] and others. Whether such fleeting impressions are indeed the raw stuff out of which more complex images emerge [e.g., 7, p. 25] remains to be demonstrated.

be that these are, indeed, impressions of imagery which has previously transpired and which has been forgotten or supplanted by fresher, more detailed and vivid imagery. On the other hand, the impression may be an attribution that a given state of affairs at image onset was due to some likely, but never really experienced, previous events. In a preceding example, the phrase "I had dropped some candies" reflects this contextual aspect of the imagery. The dropping of the candies was an event that was already in place at the onset of the image and was not remembered as having actually been experienced.

4. Hypnagogic Image

This part of the sequence consists of the appearance of a fully-developed hypnagogic image of which two phenomenological attributes can be delineated. First, the images are brief and dynamic. They are not static like still photographs; they are dynamic like very short, one- to two-second video clips. This feature of the imagery was demonstrated, in part, by the statistical analysis of illusory movement reported earlier. The illusory movement is bounded on one side by the pre-imagery context described in Part 3, and on the other by an abrupt awakening. It thus often has the appearance of a segment which was extracted from an ongoing stream of kinetic imagery. This feature is well-described in Sartre's differentiation between the seeing of a face during wakefulness and in the hypnagogic state: in waking ". . . something appears which is then identified as a face . . ."; in the hypnagogic state ". . . one becomes aware of being in the act of seeing a face." [13, pp. 55-56].

Second, hypnagogic images are typically coherent and hallucinatory when they appear in awareness. An image does not appear to evolve from a series of more elementary constituents, but rather to erupt into consciousness from the silent period with a "full-blown" flavor [2]. During its brief appearance, some combination of the following illusory attributes characterizes the hallucinatory dimension of the hypnagogic image:

a. apparent vestibular orientation, i.e., a sense of subjective "up";
b. apparent visual orientation to a background scene, including the movements of other characters;
c. apparent visual orientation to a foreground object, usually experienced as something close to the self;
d. apparent sounds, localized in space, usually the human voice;
e. apparent bodily posture, usually restricted to awareness of a single body region;
f. apparent self-movement, usually of only a single muscle group;
g. apparent contact with an object, usually by the hands, feet, or face.

The more of these attributes that are present in the image, the more hallucinatory the image will seem. However, it is this vivid hallucinatory structure of the imagery which often forces the return of conscious awareness. This frequently takes the form of a subtle orienting reaction, or even a surprise or startle. The

apparent perceptual engagement that accompanies this hallucinatory content is frequently so realistic that a corresponding muscular movement (or phasic NME) may be evoked. The movement that thus occurs is typically the most subjectively hallucinatory of the various attributes image sequence. Hallucinatory quality is thus also implicated in the impression that hypnagogic imagery has a "sudden" or "intrusive" quality [3]. A common example of this is the hypnagogic image which suddenly places one in the position of stepping off into space. The very real reflex response reflected in the limb jerk attests to the hallucinatory reality of the event.

DISCUSSION

Although general conclusions about the nature of hypnagogic imagery cannot be drawn from the present results, there are nevertheless many trends in the data which suggest how the method could be used in larger group studies. First, the results indicate that the Upright Napping procedure can enhance access to hypnagogic imagery during different times of the day. This demonstration is a step toward standardization of data collection procedures in a domain where hypnagogic imagery is too frequently collected under unspecified conditions. The procedure described produces imagery that can be controlled for time of day, body position, and phasic and tonic neurophysiological state. Other environmental variables such as levels of ambient light, background noise, and pre-napping activities could also be controlled with little difficulty.

It is likely that the use of drowsiness as a criterion for initiation of a napping session yielded imagery during a time of day that may be the nadir in a circasemidian[2] biorhythm, i.e., a time when the tendency to slip into a "siesta" state is at its highest [14]. The present finding that napping sessions tended to occur at around 4:00 p.m. is consistent with this possibility. The timing of REM sleep dream imagery is also determined by such biorhythms, suggesting that this factor should be more scrupulously controlled in any future research applications of the present procedure.

Second, the data gathered with the present procedure are relevant to the hypothesis that hypnagogic imagery and dream imagery are qualitatively similar. Results indicate that illusory movement is an almost ubiquitous feature of the hypnagogic imagery in this study. The finding is consistent with other research suggesting that kinesthetic imagery is a primary aspect of dream imagery [15-17]. Introspective review of the data suggests that the illusory movements are associated with the hallucinatory quality of the imagery; hallucinatory quality is a feature that Freud found essential to his psychological definition of dreaming [18]. A cautionary note should be added, however. The upright posture used in the present study is quite different from the horizontal position typically used in studies of dream

[2] Circasemidian: about half a day.

content. The higher levels of muscle tension and vestibular stimulation associated with the upright position may well have influenced the occurrence of illusory movement and the hallucinatory qualities of the imagery in this sample.

Third, the present results provide evidence relevant to hypotheses about illusory movement in hypnagogic imagery. The results indicate that illusory Self and illusory Other movement tend to occur equally often but not typically simultaneously. They also tend to be associated differentially with falling and speaking imagery, and with different types of NME. The two movement categories may thus reflect the activity of two relatively independent imagery production systems. One possibility is that phasic limb jerks, illusory Self movements, and falling images are all expressions of an image process which derives from underlying motor and vestibular activation, whereas head nods, illusory Other movements, and speaking are all expressions of a process more closely associated with general muscle atonia.

Fourth, the present results have implications for hypotheses concerning the microgenesis of hypnagogic imagery. In the present finding of a high frequency of Self-Other confusions, there was a hint of a process which may precede production of Self or Other movements; a process during which an incipient motor program may be instantiated as either a Self or an Other movement [19]. In the occurrence of scene shifts, there was some suggestion of an elementary process also found in the smooth transitions between images in longer dream sequences. In the introspective analysis, there was evidence of both an inhibitory, "silence"-inducing process, and a "surprise" or "intrusiveness" process governing presentation of individual hypnagogic images. These processes may be expressions of the orienting reaction in dream production [20, 21], or of processes of "intrusiveness" in the production of imagery bizarreness [22]. Finally, in the results for tonic NMEs, there was some indication that tonic neuromuscular activity may determine features of illusory movement. This hypothesis and its relationship to the hallucinatory quality of dream imagery is examined in detail elsewhere [16].

In conclusion, the Upright Napping procedure appears to be a useful method for observing spontaneous hypnagogic images in detail. It facilitates access to hypnagogic imagery during the daytime without elaborate preparations such as sensory deprivation or ganzfeld effects [e.g., 23]. The procedure may thus be useful for studying dreamlike imagery in circumstances where sleep laboratory methods are inappropriate or unavailable. With further trials and refinements, the procedure may contribute to research on fundamental questions about the diversity and microgenesis of dream imagery production. The value of the procedure for facilitating expression of surrealistic art remains to be explored.

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REFERENCES

1. S. Dali, *The Secret Life of Salvador Dali*, Vision Press, London, England, 1976.
2. A. Maury, Des Hallucinations Hypnagogiques ou des Erreurs des Sens Dans L'état Intermédiare Entre la Veille et le Sommeil, *Annales Médico-Psychologique du Systéme Nerveux*, 11, pp. 26-40, 1848.
3. E. B. Leroy, *Les Visions du Demi-sommeil*, Librarie Felix Alcan, Paris, France, 1926.
4. H. Silberer, Report on a Method of Eliciting and Observing Certain Symbolic Hallucination Phenomena, *Organization and Pathology of Thought*, D. Rapaport (ed.), Columbia University Press, New York, pp. 195-207, 1951.
5. H. Silberer, On Symbol-formation, *Organization and Pathology of Thought*, D. Rapaport (ed.), Columbia University Press, New York, pp. 208-233, 1951.
6. D. L. Schacter, The Hypnagogic State: A Critical Review of the Literature, *Psychological Bulletin, 83*, pp. 452-481, 1976.
7. A. Mavromatis, *Hypnagogia. The Unique State of Consciousness Between Wakefulness and Sleep*, Routledge & Kegan Paul, London, England, 1987.
8. W. D. Foulkes and G. Vogel, Mental Activity at Sleep Onset. *Journal of Abnormal Psychology, 70*, pp. 231-243, 1965.
9. I. Oswald, *Sleeping and Waking, Physiology and Psychology*, Elsevier, New York, 1962.
10. G. Vogel, D. Foulkes, and H. Trosman, Ego Functions and Dreaming during Sleep Onset, *Archives of General Psychiatry, 14*, pp. 238-248, 1966.
11. G. Vogel, B. Barrowclough, and D. Giesler, Limited Discriminability of REM and Sleep Onset Reports and Its Psychiatric Implications, *Archives of General Psychiatry, 26*, pp. 449-455, 1972.
12. A. L. Edwards, *Experimental Design in Psychological Research,* (4th Edition), Holt, Rinehart and Winston, New York, pp. 29-48, 1972.
13. J. P. Sartre, *The Psychology of Imagination*, Citadel Press, New Jersey, 1972.
14. R. Broughton, Biorhythmic Variations in Consciousness and Psychological Functions, *Canadian Psychological Review, 16*, pp. 217-239, 1975.
15. B. Lerner, Dream Function Reconsidered, *Journal of Abnormal Psychology, 72*, pp. 85-100, 1967.
16. T. A. Nielsen, Reality Dreams and Their Effects on Spiritual Belief: A Revision of Animism Theory, in: Dream Images: A Call to Mental Arms, *Imagery and Human Development Series*, J. Gackenback and A. A. Sheikh, (eds.), Baywood, Amityville, New York, pp. 233-264, 1991.
17. M. Bosinelli, P. Cocogna, and S. Molinari, The Tonic-Phasic Model and the Feeling of Self-Participation in Different Stages of Sleep, *Giornale Italiano di Psicologia, 1*, 36-65, 1974.
18. S. Freud, *The Interpretation of Dreams* (originally published in 1900), Basic Books, New York, 1955.
19. D. L. Kuiken, Dreams and Self-knowledge, in: *Sleep and Dreams, A Sourcebook*, J. Gackenback, (ed.), Garland, New York, pp. 225-250, 1987.
20. T. A. Nielsen, D. L. Kuiken, and D. L. McGregor, Effects of Dream Reflection on Waking Affect: Awareness of Feelings, Rorschach Movement, and Facial EMG, *Sleep, 12:3*, pp. 277-286, 1989.

21. D. Kuiken and S. Sikora, The Impact of Dreams on Waking Thoughts and Feelings, in: *Functions of Dreaming*, A. Moffitt, M. Kramer, and R. Hoffmann, (eds.), Buffalo, New York, SUNY Press, (in press).
22. H. Hunt, *The Multiplicity of Dreams*, Yale University Press, New Haven, Connecticut, 1989.
23. M. Bertini, H. B. Lewis, and H. A. Witkin, Some Preliminary Observations with an Experimental Procedure for the Study of Hypnagogic and Related Phenomena, *Archivio di Psicologia Neurologia a Psychatria, 6*, pp. 493-534, 1964.

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