

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

TORE A. NIELSEN, PH.D.

University of Montreal, Canada

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.

*This article is based upon a paper delivered at the Eighth Annual International Conference of the Association for the Study of Dreams, Charlottesville, Virginia, June 25-29, 1991.

Such imagery is now widely recognized to be characteristic of the surrealist 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 reverie 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	<i>n</i>	%
Head	22	56.4
Leg	9	23.1
Hand/arm/shoulder	6	15.4
General	2	5.1
Total	39	100.0

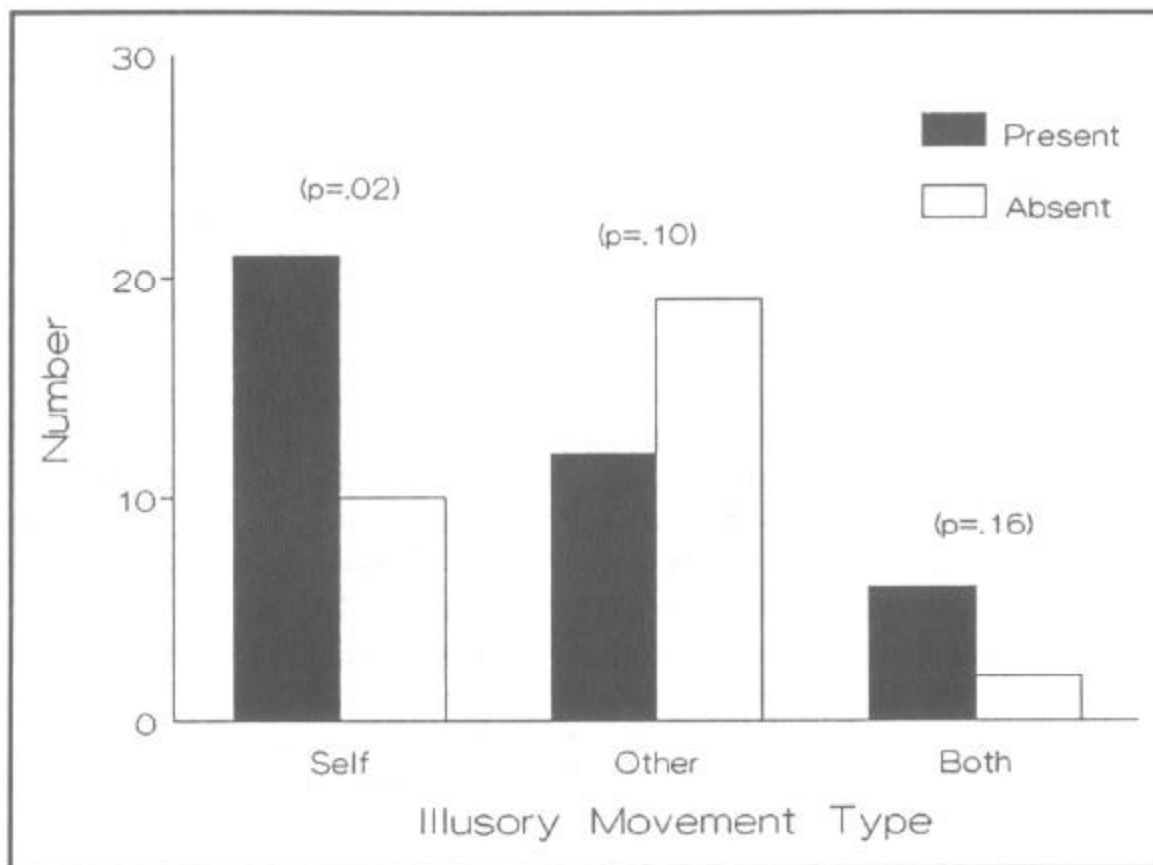


Figure 1. Frequency of illusory movements when phasic NME is present or absent ($n = 70$).

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	
	<i>n</i>	%	<i>n</i>	%
Self	4	(23.5)	11	(68.7)
Other	13	(76.5)	5	(31.3)
Total	17	(100.0)	16	(100.0)
	$(p = .02)$		$(p = .07)$	

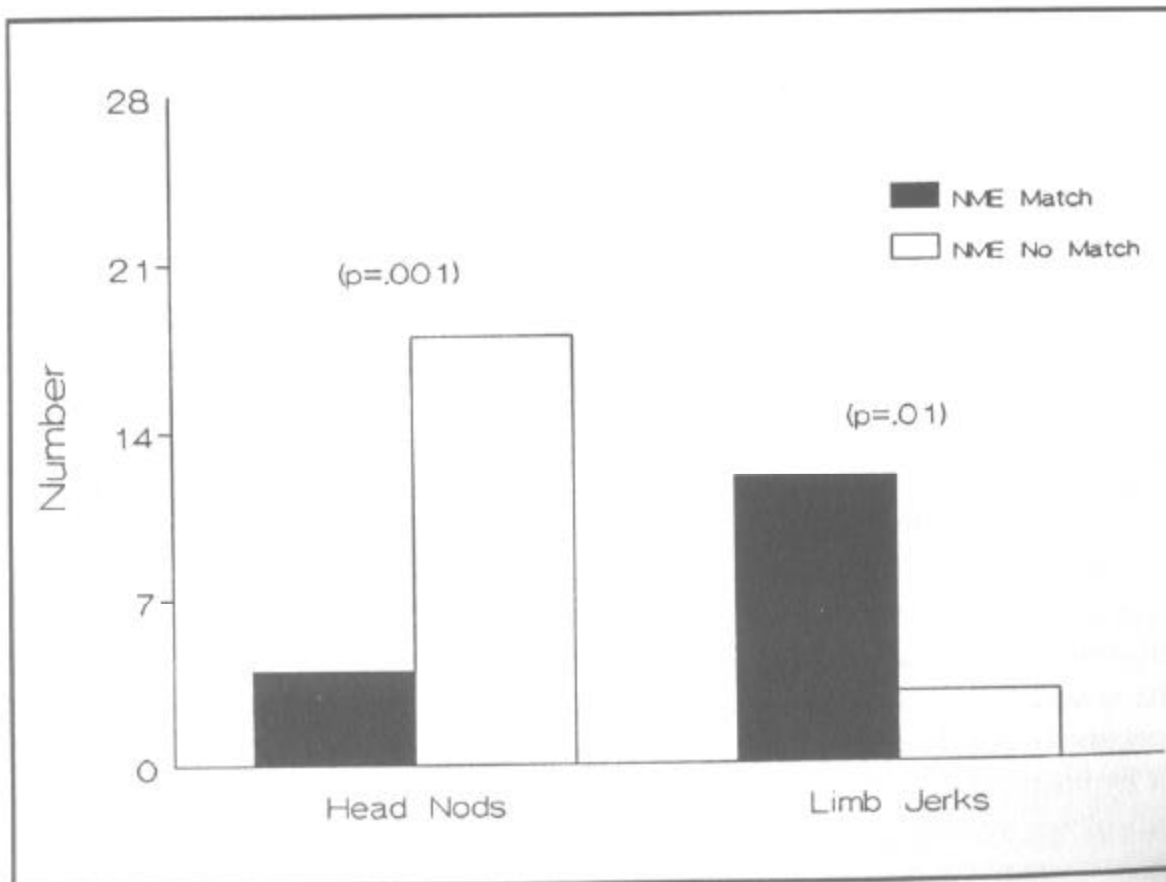


Figure 2. Correspondence between phasic NME types and illusory movement ($n = 37$).

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.