The magic of the moment: What it means to be a punctual verb

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0. Introduction

Lexical-semantic theories often suffer from the imprecision of the concepts they employ in their representations. This leads to a considerable decrease in empirical strength by inviting circular argumentation. A demonstration of how to go about overcoming such shortcomings will be carried out, using the lexical semantic concept of 'punctuality' as an example. Firstly, I will argue that the distinction between punctuality and durativity plays a crucial role for the explanation of a wide range of syntactic and semantic phenomena. Secondly, I will discuss methodological issues involved in arriving at a more precise definition of punctuality and, finally, the notion of 'punctuality' will be given an interpretation on the basis of extensive consultation of research on cognitive time concepts.

1. Linguistic evidence for a notion of 'punctuality'

Among the linguistic constructions whose grammaticality is based on a punctuality restriction is the PP headed by *an* in German, which alternates with an accusative object.[1] The construction is restricted to verbs that express a change of state, i.e., refer to an event with a result state. Among these, only durative verbs like *schreiben* 'write', *bauen* 'build', *nähen* 'sew', but not punctual verbs like *sprengen* 'blast, blow up', *brechen* 'break', *knicken* 'fold' are admissible:

(1) sie schrieb einen Roman / an einem Roman [durative; change of state]
'she wrote / was writing a novel (literally: "wrote at a novel")'

(2) sie quälte ihren Pudel / *an ihrem Pudel [durative; no change of state]
'she teased / was teasing her poodle'

(3) sie sprengte die Brücke / *an der Brücke [punctual; change of state]
'she blew up / was blowing up the bridge'

(4) sie kniff ihren Freund / *an ihrem Freund [punctual; no change of state]
'she pinched / was pinching her friend'

Adverbials denoting a span of time (e.g., *in two hours*) usually combine with verbs referring to durative, resultative events, as in (5), Punctual verbs with a result state do not allow these adverbials (6) unless a preceding event is presupposed as in (7), where it is presupposed that Rebecca had been moving towards the summit:

(5) Rebecca wrote the paper in six weeks

(6) ??Rebecca noticed the painting in five minutes

(7) Rebecca reached the summit in two hours

Durative adverbials (e.g., *for two hours*) which usually combine with non-resultative durative verbs (8) evoke an iterative interpretation when combined with punctual verbs (9). This even seems to hold when the temporal adverbial denotes an extremely short period of time (10):

(8) she read / was reading for a couple of minutes
(9) she knocked / was knocking for a couple of minutes (→ repeatedly)
(10) she hopped / was hopping for two seconds (→ repeatedly)

While all (non-stative) durative verbs allow the progressive form, there are occurrence and interpretation restrictions for punctual verbs: Non-resultative punctual verbs occur in the progressive on an iterative interpretation (11). Punctual verbs that presuppose a preceding event can occur in the progressive, too, as in (12) where it is presupposed that Rebecca participated in the race or was nearing the completion of her journey; in these cases, the reference time is the time of the preceding event. Punctual verbs that do not belong to these two classes, especially those that lead to cognitive states, do not allow the progressive (13):

(11) Rebecca was pinching Jamaal / was hopping (→ repeatedly)
(12) Rebecca was winning the race / was arriving
(13) ??Rebecca was noticing that / ??that was astonishing Rebecca

Punctuality is among the conditions that determine the occurrence of the expletive reflexive pronoun *sich* with those intransitive verbs that take part in the causative-inchoative alternation in German. According to Oya (1996), verbs that refer to punctual events (*zersplittern* 'to shatter', *abreißen* 'to tear off', *starten* 'to start'), to events that originate naturally (*schmelzen* 'to melt', *gären* 'to ferment'), or to movements of an object (*fahren* 'to drive', *rollen* 'to roll', *segeln* 'to sail') do not occur with the reflexive pronoun:

(14) der Zweig biegt sich / *der Zweig biegt 'the twig bends'
(15) *der Zweig bricht sich / der Zweig bricht 'the twig breaks'

Punctual verbs do not occur as complements of aspectual verbs like *to finish* and *to start* as in (16) unless they can get an iterative interpretation as in (17) which is usually available for non-resultative ones:

(16) *the vase started / stopped breaking
(17) he started / stopped hopping (→ repeatedly)

Thus, 'punctuality' does play an important role in the explanation of a wide range of different lexicon-driven syntactic and semantic phenomena. It accounts for valence phenomena (linking) like the *an*-construction and the reflexive pronoun with inchoative verbs, it serves to express selectional restrictions of aspectual adverbials, it explains grammatical categorial restrictions like the occurrence of verbs in the progressive, and it is involved in interpretation restrictions such as the iterative interpretation of verbs of certain classes in certain contexts.

2. Methodological problems in lexical semantics

2.1. Avoiding circularity

Lexical semantic theories, in particular decompositional or thematic role based theories of verb semantics, usually proceed by first describing certain syntactic properties of verbs such as particular subcategorization frames or valence alternations. Then they introduce semantic notions like 'agent' or 'cause' which are supposed to explain the syntactic patterns but are kept very vague in meaning. It is implicitly or explicitly suggested that the linguistic phenomena justify the semantic features or predicates employed in the lexical-semantic representations.

This procedure is the source of extensive circularity in a majority of lexical-semantic theories, in the sense that the syntactic phenomena tend to shape the semantic representations which in turn are what is supposed to "explain" the syntactic phenomena.[2] It should be clear that linguistic data can justify a rule like (18), but they do not justify a lexical entry that expresses something like (19).

(18) Lexical rule:
Verbs that lexically imply that the events they refer to are punctual do not occur with the *an*-construction.

(19) Lexical entry:
It is implied by *to hop* that the events it refers to are punctual.

The proposition in (19) is only justified by the states of affairs that hold in the world we are talking about, i.e., it is justified if and only if all the events we refer to with the verb *to hop* are punctual. And to make this a checkable condition we have to know what is in fact meant by 'punctual'.

To make the meaning of our lexical representations more precise and thereby increase the empirical value of our theory we have to answer three questions: I) What is the logical type of the predicates in our representations? II) What are the truth conditions of these predicates? III) What do the individual variables in our representations stand for?

Let us assume a Davidsonian event semantics framework in which verbal projections express relations between events and event participants and let's further assume we want to express that it is part of the meaning of the verb *to*

hop, λxλe[HOP(x,e)], that it is punctual and involves an agent. Then, firstly, we have to determine what the logical type of the predicates PUNCTUAL and AGENT is. Is PUNCTUAL a first-order predicate ranging over events, PUNCTUAL(e), or is it a second-order predicate PUNCTUAL(HOP)? Is AGENT a relation or a function between events and thing-individuals? Or is it a relation between predicates and arguments? Secondly, we have to state as precisely as possible the conditions under which a proposition like PUNCTUAL(e) or AGENT(x,e) is true, and, thirdly, we have to determine what exactly the sorted individual variables such as *e* and *x* stand for by giving identity criteria for these sorts.

In the remainder of the paper I will pursue the first two questions with respect to the predicate 'PUNCTUAL'.

2.2. The psychology of time

It has of course long been noticed that even 'punctual' events, as expressed by *to break, to jump, to blast, to knock*, etc. have a certain duration; they are not punctual in the sense of temporal logic. But what does 'punctuality' refer to if not to logical instants? Attempts to characterize the notion of punctuality can be traced back to the early research on Aktionsarten in the last century.[3] Pott (1859:178) assumed that with aspectual verb pairs in Slavic and pairs in German like *sitzen* 'to sit' / *sich setzen* 'to sit down' one can discover "[...] that in these pairs reference to the same kind of temporal property is made, which involves—to illustrate the matter briefly and aptly by borrowing a spatial metaphor—whether they are thought of as being p u n c t u a l in their duration (which, of course, is impossible in the strongest mathematical sense and therefore only relatively true) or as being l i n e a r"[4].

This does not differ much from definitions in more recent work on aspectuality. According to Platzack (1979:93), punctual events are those, "that do not last in time (or rather, are not conceived of as lasting in time)", and Moens (1987:102) claims that "[...] processes and culminated processes can be »compressed« into points. This [...] does not mean that they cease to have a temporal duration, but rather that their internal structure is no longer of importance."

It might be asked if it makes much sense to pretend that we conceive of short events as having no duration or to assume that punctuality is not a property of the event described by the punctual verb but rather a property of the verbal predicate to present events as having no duration. Concrete events are characterized by some kind of change over time[5]. Thus, duration is essential to these events. Conceiving of events as having no duration is like stripping events of their eventhood. In particular, these approaches do not explain why only some verbs can refer to events such that they "are not conceived of as lasting in time" while others cannot.

Apart from these considerations, the question arises why languages—as they obviously do—distinguish between events that last for a very short period of time and those that last a little longer. Semantic distinctions that prove to be relevant for numerous syntactic and semantic phenomena like 'agentivity', 'causation', 'will' are rarely completely arbitrary with respect to our cognitive architecture: they usually denote central cognitive concepts. Thus, it can be expected that the distinction between short and long events has a cognitive basis, too. In the following I will have a look at some psychological research on the cognition of time.

Among the temporal units that have proven to be relevant for human cognition and which involve a very short period of time is an interval of about 2 to 3 seconds which seems to be responsible for our "feeling of nowness" (Pöppel 1978:716) and therefore has been called the 'psychological present' (Stern 1897), the 'conscious present' (Pöppel 1972), the 'subjective present' (Pöppel 1978), or the 'auditory present' (Turner and Pöppel 1983:298). For the purpose of the paper at hand I will refer to this interval as the 'cognitive moment' and in the following sections I will present the data that support the assumption that this interval is of crucial relevance for perception, speech, and behavior.

3. 'Punctuality' in cognitive psychology

3.1. Evidence from perceptual psychology

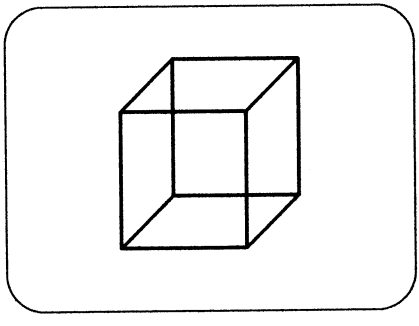
Certain phenomena that arise in connection with the perception of acoustic or visual stimuli involve an interval of about 2 or 3 seconds. A classic example concerns errors in estimating the length of intervals. When confronted with the task of reproducing acoustic or visual stimuli, subjects reproduce shorter stimuli as longer than the original stimulus and longer stimuli as shorter. The indifference interval, which is the duration that is reproduced correctly, was observed to be between 2 and 3 seconds (Pöppel 1972:226f, 233).[6]

A second phenomenon is related to the perceptual grouping of acoustic events: A metronome produces sequences of beats of exactly the same loudness and exactly the same distance to each other. But listening to a metronome, we hear a rhythm by placing a weight on every other beat. Two beats are perceived as a unit such that a "tick-tock" effect occurs. Two observations have been made with respect to this phenomenon. First, it has been noticed that it is equally possible to place a weight onto every third or fourth beat, thereby creating larger units, but there is an upper temporal limit in creating acoustic gestalts of this sort (cf. Stern 1897, Pöppel 1985:55). This temporal limit also shows up if we increase the distance between the beats. Second, Wundt (1911:6) observed that a sequence of beats is no longer perceived as a unit if the duration between two beats exceeds 2.5 seconds.

The third phenomenon involves ambivalent visual patterns that allow two perceptual readings like the Necker cube in (20), of which the lower left square can be seen as the front, or the back side of the cube. Once we have recognized

both readings we can willfully accelerate the oscillation speed and switch from one reading to the other in a split second. But if we try to slow down the oscillation speed, i.e., if try to stay with one perspective, we will notice that after a couple of seconds the perspective switches unintentionally.[7] The upper limit for a constant perspective on the cube lies around three seconds with most subjects (Pöppel 1985:58).[8]

(20) The Necker cube:



Fourth, there is another less well investigated phenomenon that might fit into the picture, namely that of the oscillation of extremely faint sounds. Urbantschitsch (1875) observed that a weak auditory stimulus is only heard periodically. When a watch is held some distance from the ear such that its ticking is barely audible, the perception of the ticking disappears and reappears in a rhythm of a couple of seconds. The same effect has been observed for different sources of sound waves.

Finally, more evidence for the subjective present can be found in musical rhythms, where Pöppel (1985:86) claims to have shown that the tempo of music in the classical-romantic tradition is related to a three-second interval.

3.2. Evidence from speech production

More evidence for the cognitive relevance of an interval of around 3 seconds comes from speech production, especially the recitation of poetry. Turner and Pöppel (1983) investigated the rhythm of pauses in spoken poetry. Defining a "LINE" as a metrical unit preceded and followed by a distinct pause, which "divides the verse into clearly identifiable pieces" (Turner and Pöppel 1983:286), they observed that the vast majority of LINEs take between 2 and 3 seconds to recite. The exact results can be found in (21), based on a sample of 200 poems (Turner and Pöppel 1983:288), where most of the LINEs with a length of more than 4 seconds contain a caesura.[9]

(21)	LINE-length of under 2 seconds	3%
	LINE-length of 2-3 seconds	73%

LINE-length of 3-4 seconds	7%
LINE-length between 4 and 5 seconds	17%

The poems stemmed from different languages. Those from Latin, Greek, English, Chinese, Japanese, French, and German had been recorded and measured while the results from those from Ndembu (Niger-Congo), Eipu (Papua), Spanish, Italian, Hungarian, Celtic and Slavic languages had been gained by syllable count alone assuming an average syllable length of ½ s for tonal and ¼ s for non-tonal languages (Turner and Pöppel 1983:286).

Results without significant differences have been obtained for languages with very different accent, tone, metric and syntactic systems. Furthermore, Turner and Pöppel (1983:288) found that the LINE as a fundamental unit is nearly always a semantic, syntactic, and rhythmic unit. The length of the LINEs cannot be explained by requirements on breathing (Turner and Pöppel 1983:286). Turner and Pöppel (1983:306) conclude that the three-second LINE is a cultural universal related to the three-second auditory present.

According to Pöppel (1985:71), spoken language in general tends to scatter pauses into the articulatory stream every three seconds or so. They are conceived of as planning pauses that are not required for air intake but serve to plan the next part of an utterance. The independence of speech rhythm from breathing requirements has been revealed by other researchers, too. We do breathe when we pause but the function of the pause is to separate conceptual units (cf. Handel 1989:426). Turner and Pöppel (1983:296) assume that the interval of 3 seconds aids the synchronization of the activities of the speaker and the hearer. The speaker uses the pause after the interval for planning the finer structure of the next part of the utterance by making syntactic and lexical decisions, and the hearer needs the pause to integrate what he has heard during the last interval.

3.3. Evidence from behavioral studies

The temporal structure of short-term human actions was the subject of two investigations carried out by Schleidt (1988) and Feldhütter (1989). Schleidt analyzed filmed scenes of people of different cultures (Trobriand islanders, Europeans, Yanomami Indians, Kalahari Bushmen) performing unstaged simple repeated actions or sequences of short actions involving finger, hand, and arm (e.g., waving, pointing, clapping hands, poking, shaking, knocking, hitting, stroking, throwing, tickling), foot and leg (e.g., kicking, hopping, stomping, crawling), head (e.g. nodding, shaking), mouth (e.g., kissing, licking, blowing), and trunk (e.g., rocking, wobbling). The mean length of the single actions was around half a second, where the length of the episodes that consisted of single repeated actions or complex sequences of non-repetitive actions was between 2 and 3.5 seconds in more than 80% of the 255 cases.[10] After this period the actions either stop or the action pattern alters. No significant differences could be found with respect to culture, sex, age, or the parameter of whether the action was

performed alone or during social contact. The results show "that persons obviously act in 'behavioral units' which last about 3 s" (Schleidt 1988:74). These units are interpreted as reflecting a universal human time constant that is due to a time-regulating mechanism in the central nervous system.

Another cross-cultural investigation of short-term behavior of Yanomami Indians, Trobriand islanders and the Southwest African Himba yielded similar results.[11] Feldhütter (1989) analyzed filmed scenes of movement units in work behavior (1091 cases, e.g., chopping, hitting, peeling, wiping, rubbing, cutting, stirring, sewing) and actions consisting of hand-body contact (451 cases, e.g., scratching, pinching, touching or rubbing a body part). A movement unit is defined as an action from its beginning either until its end (e.g., the movement of the hand and fingers stopped), until the beginning of a new action (e.g., after having peeled a piece of fruit the peel is thrown away), until the same action is performed in another place (e.g., the peeling of the fruit is continued at a different part of the fruit), or until the movement pattern of the action itself changes (e.g., the peeling movement is continued by using the index finger instead of the thumb). The same holds for the approximately 20% of the represented episodes that were repeated actions, where a movement unit consists of a sequence of at least three similar, uninterrupted actions and is separated from other movement units by the above-mentioned criteria.

The evaluation of the data revealed that only 7% of the units exceeded the duration of 4 seconds. The majority of movement units had a length between 2 and 3 seconds, where the units consisting of repeated actions were slightly longer (median length 2.9 s) than those consisting of single, non-repeated actions (median length 2 s) (Feldhütter 1989:15). No significant differences could be found with respect to culture, sex, age, the distinction between work behavior and hand-body contact, the parameter of social interaction, or the question whether the agent pays attention to the action or not. Furthermore, it could be shown that no functional requirements of the work process were responsible for the temporal structure of the actions. For example, a girl who planed a piece of wood planed 4 times (2,4 s), stopped, started again and planed two times (1,6 s) before getting stuck, starting over again, and then planing 6 times (2.6 s) (Feldhütter 1989:21). The length of the first and third sequence, which were inside the crucial interval, was neither due to an external interruption nor required by any functional aspect of planing. The temporal structure of these sequences is completely endogenously determined.

3.4. The 'cognitive moment'

In a discussion of data from perceptual psychology, involving the three-second interval, Pöppel (1985) assumes that the "feeling of nowness" is a subjective reality determined by a brain mechanism that integrates successive events into a perceptual gestalt whose duration is restricted to an upper limit of about three seconds (Pöppel 1985:53). This gestalt creates something like a window of

consciousness. The conclusion Stern (1897:334), Pöppel (1985:54), and others have drawn is that the present is more than just a borderline between past and future, or, as James (1918:609) puts it, it "is no knife-edge, but a saddle-back, with a certain breadth of its own on which we sit perched, and from which we look into two directions into time." The data from behavioral psychology furthermore suggest that not only the perception of events but also the structuring of actions is based on the cognitive moment.

Several interesting features are connected to the cognitive moment: The experiments with the oscillating ambiguous pattern show that only one content at a time is present in the window of consciousness. We don't see both patterns of the Necker cube simultaneously, nor do we see an amalgamation of both patterns (Pöppel 1985:61). Furthermore, the experiments with ambiguous patterns, metronome beats and action patterns reveal that the crucial 3 seconds are an upper, not a lower limit. Shorter action and perception gestalts are possible (Pöppel 1985:63, Feldhütter 1989:31). This is different for longer stimuli: The experiments designed to determine the length of the indifference interval show that in underestimating the length of stimuli which exceed the limit of 3 seconds, subjects try to perceptually press these longer events into the limits of this interval (Pöppel 1985:62).

Turner and Pöppel (1983:297) hint at a general function for the cognitive moment. Different information takes different amounts of time when processed by different perceptual media. The cognitive moment allows the cortex to collect and integrate all the information into coherent information bundles available to our conscious experience. In that every three seconds the old information in this window of consciousness is replaced by new information, the stream of consciousness is successively created.

4. 'Punctuality' and the lexicon

4.1. Punctual events

The perception of events is guided by the cognitive moment and our own actions are structured by the same three-seconds interval. Thus, it seems justified to assume that our general cognitive concept of events involves a classification into punctual and durative events. Simple or complex events are conceived of as punctual if their duration does not exceed an interval of around three seconds and they are conceived of as durative if they do. Since the distinction between 'punctuality' and 'durativity' is a central cognitive concept it is not surprising that the reference to punctual events on the one hand and durative ones on the other hand is—as has been shown in section 1—mirrored by the different semantic and syntactic behavior of the expressions.

By postulating the cognitive moment as the basis for our conception of punctuality I do not want to claim that there are never events that are punctual in the sense of temporal logic. Likely candidates for expressions related to logical

instants are those like the following, which refer to events that are not perceptible but come into being by sheer convention:

(22) the contract came into force on Tuesday, twelve o'clock sharp
(23) the armistice began exactly at twelve o'clock

According to the given definition these events are subsumed under the concept of punctuality since they do not exceed the crucial interval. As far as the data discussed in section 1 are concerned, a separation of logically punctual events from psychologically punctual events seems unnecessary.

4.2. Punctual verbs

So far we have seen what it means for an event to be punctual. Now, in what sense can we talk about verbs as being punctual, i.e., conceiving of punctuality as a second-order property of verbal predicates? An answer that suggests itself would be to say that those verbs are punctual which always refer to punctual events, like *to hop*, which can be expressed by a meaning postulate like (24):

(24) $\forall x \forall e[\text{HOP}(x,e) \rightarrow \text{PUNCTUAL}(e)]$

But two things have to be taken into consideration. Firstly, there are some verbs which can refer to punctual or durative events, i.e., to events whose duration is either inside or outside the limits of the cognitive moment:

(25) the ball rolled along the sideline (for two / twenty seconds)
(26) she screamed (for two / twenty seconds)

Secondly, the definition of punctuality is based on a cognitive category that largely depends on properties of our perceptual apparatus and our short-term behavior. Of course, not all events we refer to are concrete events we can immediately perceive, or basic human actions. But I will assume that the basic readings of verbs are those readings in which they refer to concrete events that are—to put it this way—epistemologically accessible by immediate perception. That means that their existence and their properties can be checked by just perceiving them.

Besides the basic reading most event verbs have metaphorical readings, too, such that some of the semantic structure of the basic reading carries over into the metaphorical reading. With respect to the punctual-durative distinction for metaphorical readings three cases can be observed[12]: I) The temporal structure of the basic reading as in (27) or (28) is completely preserved as in (29) and (30), both of which still refer to events that are punctual. II) Part of the temporal structure can be preserved as in (31), (32), or (33), where we cannot determine the temporal boundaries of the events referred to very precisely, but probably would not want to say that the events last less than three seconds. The structure is insofar

preserved as the expressions refer to changes that are relatively short and sudden compared to the long lasting steady situation before; the temporal structure is mapped onto a different scale. III) Finally, there are cases where the temporal structure is not carried over into the derived reading, as in (34). Breaking a promise by not doing something does not take any time; it probably does not refer to an event at all.

(27) Ron broke the vase
(28) Rebecca broke her leg
(29) the submarine broke (through) the surface
(30) at last Rebecca broke the silence
(31) this year Jamaal broke his close ties with the Detroit Pistons
(32) Rebecca managed to break the deadlock
(33) this decision could make or break her career
(34) Rebecca broke the promise (by never giving Jamaal any flowers)

In conclusion, punctual verbs are verbs that refer to punctual events in their basic reading, i.e., verbs whose basic reading is connected to a meaning postulate as in (24). Thus, *to break* (27-34) is a punctual verb but *to roll* (25) and *to scream* (26) are not. But why do we need the notion 'punctual verb' at all? The syntactic phenomena discussed in section 1, such as the *an*-construction and the reflexive pronoun with inchoative verbs, are solely based on the temporal information connected to the basic reading. Even in non-basic readings as in (35) where we don't want to say that the expression refers to a punctual event, as *zerbrechen* 'to break' does in its basic reading, we still cannot add a reflexive pronoun. Similarly, (36) does not refer to an event that is punctual in a strict sense, but the *an*-construction is nevertheless impossible.

(35) die Beziehung zerbrach (*sich)
'the relationship broke up'
(36) sie spaltete die Partei / *an der Partei
'she split the party / was splitting the party'

Thus, the rules expressing the syntactic distribution phenomena are not immediately based on the actual reading of the verb and its reference to punctual vs. durative events but on the answer to the question of whether the verb is a punctual verb, i.e., refers to punctual events in its basic reading.

Notes

[1] For references and a more extensive discussion of the following phenomena cf. Engelberg (1998:64ff, 1999).

[2] For examples cf. Engelberg (1998).

[3] In Engelberg (1999) the research history is presented in more detail.

[4] My translation of: "[...] in beiden Rücksichtnahme auf eine gleiche Eigenschaft der Zeit, nämlich danach, ob sie - um die Sache durch ein vom Raume entlehntes Bild in Kürze und schlagend zu veranschaulichen - ihrer Dauer nach p u n k t u e l l gedacht wird (was freilich in strengster mathematischer Strenge unmöglich und demnach nur beziehungsweise wahr), oder l i n e a r."

[5] Cf. Engelberg (1998:216ff) for a lengthy discussion of the ontology of events.

[6] A number of experiments have been carried out by different researchers which yielded partly different results. Pöppel (1978) gives an overview and discusses the extent to which the different results were due to the setup of the experiments and the theoretical frameworks employed.

[7] It is sometimes possible to overcome this effect by fixing one's eyes on a certain edge of the cube and thinking of something else.

[8] Ditzinger and Haken (1989) give an overview on the research on this phenomenon and show that the length of the oscillation interval depends to a certain degree on the kind of pattern, on a possible dominance of one of the patterns, and on the length of the habituation time.

[9] It's not quite clear why these lines have not been counted as two LINEs in the first place which would correspond to the previously mentioned definition of 'LINE'.

[10] Most of the other cases were significantly longer episodes (5 - 55 seconds). These episodes are explained as stereotyped movements that serve a regulatory biophysiological function in that they reduce the heart beat and thereby calm down the system.

[11] A summary of Feldhütter's (1989) dissertation can be found in Feldhütter, Schleidt and Eibl-Eibesfeldt (1990).

[12] Some of the following example sentences have been adapted from the Collins COBUILD English Language Dictionary.

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