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Déjà Vu Explained? A Qualitative Perspective

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St Augustine first referred to déjà vu in c. 400AD as "*false memoriae*." However, since the late nineteenth century, when there was a flurry of research (Wigan, 1844, "the sentiment of persistence"; Jackson, 1880, "mental diplopia"; Bourdon, 1893, "reconnaissance des phénomènes nouveaux"; Arnaud, 1896, "fausse memoire"; Bergson, 1908, "souvenir du present"), the study of déjà vu has largely remained under-researched in mainstream scientific investigation. This article employs qualitative analysis to examine and explain the theories of the causes of déjà vu or stimuli characterised by a feeling of familiarity in the absence of recollection. It also explores a psychological "profile" for the experience of déjà vu and draws inferences about the physiological "purpose" of déjà vu and the evaluative dimensions of the phenomenological experience of it. Qualitative analysis reveals that déjà vu is a commonly occurring normal experience and that while it may be an effect of temporary over-excitation of hippocampal synaptic transmission, it has a purposeful cognitive function by acting as an orientation-reflex to spatial-temporal reflection in experients' momentary consciousness.

Keywords: déjà vu, memory, phenomenology

Explanations of déjà vu or the perceived feeling of "any subjectively inappropriate impression of familiarity of a present experience with an undefined past" (Neppe, 1983, p. 3) is a common lifetime experience among approximately 67% of the population (Brown, 2003, p. 397) occurring on average once yearly amongst people who report experiencing it. The experience is thus consistent with psychological normality. Whilst the subject of déjà vu most obviously belongs to psychology, as the study of a specific happenstance of memory it has long been described in literature, as an "as if" experience that doesn't quite fit.

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I have been here before,
But when or how I cannot tell:
I know the grass beyond the door,
The sweet keen smell,
The sighing sound, the lights around the shore.

Dante Gabriel Rosetti,
"Sudden Light," 1854

Characteristically, déjà vu is often brief in experience, lasting for no-longer than five seconds, although the experience itself is phenomenologically unforgettable. Indeed, Proust's (1913–1927/1992) *À la Recherche du Temps Perdu* is famously a monologue on déjà vu and conscious recollection, running to nearly one and half million words. More recently, Joseph Heller described déjà vu in quasi-psychological terms in *Catch-22* as ". . . just a momentary infinitesimal lag in the operation of two coactive sensory nerve centres that commonly functioned simultaneously" (1961, p. 268). Heller's point might have been to introduce an anthropomorphic fallacy into his famous novel, however, O'Connor and Moulin (2008) identify two types of theory classifications for déjà vu in cognitive psychology. Firstly, progressing from small or subordinate units involving perceptual theories arising from familiarity invoked from a perceptual environment, and secondly, theories suggesting déjà vu result from an over-arching cognitive feeling that is applied to a perceptual input (Moulin and Chauvel, 2010, p. 214). Some psychologists describe the phenomenon as a glitch in the working memory of the system or a problem with how the perceptual world is communicated to the part of consciousness which is interpreting it (Moulin and Chauvel, 2010, p. 214; Seamon, Brody, and Kauff, 1983). At its most fanciful, déjà vu experiences may lead to people believing themselves to be living in a computer simulation (Bostrom, 2003). Furthermore, participants in some psychological experiments of déjà vu report experiencing it within dreams. Kusumi (2006, p. 308) argues that dreams are "compressed past real experiences" that are similar to typical perception of scenes experienced during waking consciousness. Dream fragments evoke sensations of familiarity from their similarity, triggering déjà vu. However, from the perspective of cognitive processing, déjà vu occurrences within the normal range of waking conscious experience are in fact useful — a form of triggering mechanism or "re-alignment" process in the experience of the individual's subjective conscious present. Given that most experiences of déjà vu are parenthetic — an experience of temporal illusion that is recognised — déjà vu may serve to re-orientate the experient to a conscious state that results in an enhanced perceptual awareness, despite the fact that as Neppe suggests, "'inappropriate familiarity' specifies the core component of the déjà experience" (1983, p. 205). This assertion that déjà vu is actually useful is supported by aspects of recognition heuristics. Analogical reasoning in which the cognitive demands of a previous problem provide a solution

to a new one is similar to the sense of familiarity caused by a problem in present experience enabling the retrieval of solutions from past experience. However, it is argued that the dissonance of the déjà vu among normal experients actually causes a valuable re-alignment of cognitive functioning within present consciousness, in this sense the useful cognitive experience is phenomenonological rather than semantic in nature.

Déjà vu also has been described as paramnesia of wrong recognition of an experience (Brown, 2003, p. 395). However, the déjà vu phenomenon itself could be seen as paradoxical as it is ostensibly the right recognition of a wrong experience and hence very useful for realigning cognitive processing with both subjective and objective reality. As O'Connor and Moulin suggest, "déjà vu is . . . a benign experience, not a pathological one, and does not lead to a behavioural impairment" (2010, p. 165). The experiences of déjà vu, experiences of "familiarity without identification of their source," occur on a continuum of recollection-based recognition (Cleary, 2008, p. 353). Strong familiarity signals are produced by a high degree of salience between features of a current situation and recollections of previous experiences in memory whereas a low degree of overlap produces a weaker cognitive signal. Thus similarity of experience to previously experienced situations produces a feeling of familiarity. Familiarity increases with resemblance (feature overlap) between situation schema experienced in the subject's present and those that are stored in memory (Cleary, 2008, p. 354). Déjà vu occurs when familiarity is experienced (feature overlap) without the possibility of temporal coincidence of perceived reality. Furthermore, in the déjà vu illusion the source of the feeling of familiarity may not be identifiable. This offers a clue to identifying the experience of déjà vu — bearing in mind that déjà vu occurs when people experience a feeling of familiarity despite evidence to the contrary, this experience may be limited to those in which there is an overlap between, (a) a feeling of familiarity, (b) an inability to identify the source of familiarity, and (c) evidence that objectively the event could not have occurred before. Thus, although almost instantaneous there may be a temporal dislocation that precipitates the déjà vu experience — a feeling of prior experience that is a minute displacement of time perception in cognition of present experience. From this perspective, déjà vu is thus a learning experience — an aid to objectivity.

Definitions

If déjà vu is a device of memory or memory dilemma, it has corollary experiences which are also within the continuum of recollection-based recognition. *Jamais vu*, for example, is a feeling of unfamiliarity with a situation which should be familiar and *presque vu* is the feeling that "one is on the verge of an epiphany" (Cleary, 2008, p. 356). *Presque vu* may be experienced by a sensation of analogical equivalence described as the discordance from having a memory

which is detected in the absence of the ability to identify a source analogy for that memory (Cleary, 2008, p. 356). Brown suggests *jamais vu* is related to word alienation (the occurrence of unfamiliarity in a familiar word) and semantic satiation (a word repeated causes a loss of connotative meaning) [2003, p. 402]. Capgras syndrome may also be related to déjà vu. This is an unusual condition in which an individual believes that a familiar friend or relative has been replaced by an imposter. Fregoli syndrome and intermetamorphosis are also related to conditions of memory alteration and identity. Under either condition, the individual may believe that a familiar (intermetamorphosis) or unfamiliar (Fregoli syndrome) individual has been replaced by a friend or relative (Brown, 2003, p. 402). Funkhouser (1983) distinguished between *déjà vecu* (already experienced), *déjà senti* (already felt), and *déjà visite* (already visited). Neppe (1983, p. 10) further distinguished the phenomenon of *déjà fait* (already done), *déjà pensé* (already thought), *déjà raconté* (already recounted), *déjà entendu* (already heard), *déjà éprouvé* (already experienced), *déjà senti* (already felt, smelt), *déjà su* (already intellectually known), *déjà trouvé* (already found, met), and *déjà voulu* (already desired). Clearly, the déjà vu experience occurs on a continuum of separately identifiable experiences that share a semblance of comparative similarity that enables them to be grouped under the one characteristic of memory dilemma. There may be up 30 such phenomenon each describing a specific aspect of the déjà experience referring to sensory, physical, intellectual and somatic experiences (Neppe, 1983, p. 5). This gives rise to the questions of (a) is there a single cognitive cause for all potential déjà vu experiences, and (b) is it possible to reproduce them in experimental conditions? Most of the literature points to a non-uniformity of phenomenon that may or may not have similar causes.

A Common Profile for the Déjà Vu Experience

Brown (2003, p. 394) suggests that 60% of the population has experienced déjà vu, its frequency decreases with age, it appears to be associated with stress and fatigue, and it shows a positive correlation with both education and socioeconomic level. Although it is more common in clinical contexts as a perceptual "aura" (or physiological experience) among patients with temporal lobe epilepsy, a figure of 60–80% for non-pathological occurrence of déjà vu amongst the general population is also confirmed by Brázdil et al. (2012, p. 1240) and Kusumi (2006, p. 312). Most surveys of the experience of déjà vu only ask about incidence rates rather than the qualitative dimensions of the experience. A survey conducted by Kohr in 1980 found that 14% of respondents had one or two lifetime experiences, 19% had three of four, 23% had five to eight, and 44% had nine or more (see Brown, 2003, p. 398). The inference from this might be that if a person has one experience of déjà vu she is likely to have another. Indeed, as Brown claims, 98% of those who have experienced déjà vu once are likely to

experience it again. However, due to the qualitative experience of déjà vu, it may be that the familiarity effect is reinforcing, and respondents are more likely to report more incidences than those actually experienced because the experience produces a memorable physiological effect even though there is no actual deficit effect on semantic memory.

Although the experience of déjà vu may be associated with mild stress and anxiety, the reinforcement of the experience is an alignment of the consciousness within a particular spatio-temporal "frame," but, according to Neppe (1983), it is not accompanied by changes in thinking or emotion. The latter is questionable as the experience of déjà vu is clearly separable from the cognitive sensations both before and after its occurrence and thus has the potential to trigger changes in thinking and emotion. Frequently, feelings of mild stress and anxiety are displaced by more intense temporary experience of temporal (and spatial) detachment. Both Neppe (1983) and Brown (2003) found that the déjà vu experience is often triggered by a visual scene and is very brief in duration, the internal reaction is one of surprise, and involves a sense of temporal dislocation — the experience of time as slowing down. However, it is very difficult to repeat a standardised scenario for these experiences in experimental conditions. Thus, many features of the déjà vu experience from the experimental position remain relatively unknown: there is either little data available of qualitative experience or that which exists is taken from very small samples (Neppe, 1983). From the perspective of experimental design, this is partially due to limitations of drawing information from retrospective designs and the fact that from a qualitative perspective, one's memory of the experience of déjà vu is more likely to be dominated by the perceptual experience of it rather than objective knowledge of one's physical, psychological, or neurological state.

What is consistent from the studies which have been conducted is that the incidence with which déjà vu is experienced decreases with age (Bernhard–Leroy, 1898; Brauer, Harrow, and Tucker, 1970). Studies have shown that déjà vu is more prevalent amongst younger people (Chapman and Mensch, 1951, pp. 168–169). Although this may appear counter-intuitive, middle-aged or older people have had a longer time-span of experience and thus by inductive inference should have more opportunity to experience déjà vu than younger people — but data show that the experience of déjà vu occurrence diminishes with age. No consistent sex difference in the occurrence of déjà vu has been found (Brown, 2003, p. 400).

However, there are further reasons why déjà vu is more common in 20–24 year olds. The first of these is neuroplasticty — certain sections of the brain are still developing at that age, leading to more adjustments in speed of neural transmission. It may be that the developing brain is more active in processing new information and so in some circumstances arousal, resulting in déjà vu experience, may be more frequent. This could also in part be influenced by socio-cultural factors. From the socio-cultural perspective, while the upper point

of stimulation may change, we all still seek medium levels of sensory arousal (i.e., inverted "U" curve) from experience. However, those that seek more arousal tend to be younger people and the rush of accompanying cognitive stimulus may result in some circumstances of momentary disruptions in neurotransmission as the brain adjusts to process perceptions from both new and familiar situations. A lower level of sensory arousal and hence experience of the déjà vu is then consistent with older age. These disruptions in neurotransmission are likely to take place in the plasticity connections between the hippocampus and the temporal lobes both of which are involved with memory and learning.

A study conducted by Chapman and Mensch (1951) revealed that educated persons aged 20 to 35 years had a higher déjà vu incidence than less-educated persons. These results were replicated by Richardson and Winokur (1967) who found a higher incidence of déjà vu in professional and student groups (47% to 73%) than unemployed and unskilled groups (25% to 43%). Perhaps this is because better-educated people may have a narrower range of information processing: their perceptions of stimuli differences have smaller variation and thus changes in cognitive processing may be more pronounced when attentional frames of reference change. Or it may be that this narrow but intensive range of perceptual experience momentarily produces over-excitation of specific brain regions. There is also evidence that those who frequently travel may have a higher incidence of déjà vu since they encounter more new locations which require increased perceptual arousal (Brown, 2003, p. 401). Chapman and Mensch (1951) found that those who do not travel have a 11% incidence of déjà vu, people who make from one to four trips yearly have a 31% incidence, and those who travel more frequently have a 32% incidence of déjà vu. Titchener reported that déjà vu may occur with physical or psychological distress or in situations of mental fatigue (1924, p. 187). From the physiological perspective, Adachi et al. (1999) stated that déjà vu may be correlated with lower glucose levels in the metabolism of the parietal cortex and mesial temporal lobe. Zuger (1966) reported a relationship between absence of dream memory and experience of déjà vu in waking consciousness, and experience of dream memory and déjà vu in sleep. Consequently, people who remember their dreams are less likely to experience déjà vu. However, even when experienced by a fatigued awakened person, déjà vu can serve to enhance normal conscious experience by reorienting a person to her temporal present experience. As the product of physiological arousal in the temporal lobe and hippocampal neurotransmitters, it is a servant, not a slave of consciousness.

Thus the three components of travel, dreaming, and repeated visual stimulus may result in potential sources of familiarity stored in the memory of people who experience déjà vu. If familiarity is accompanied by an inability to retrieve the memory source, it leads to a sense of having been already experienced (Cleary, Ryals, and Nomi, 2009, p. 1082). Other features of déjà vu include, restricted

paramnesia, a failure to recognise a portion of past memory which triggers a perception of present familiarity; redintegration, in which a whole schema of a mental state is imaged on only a part of it; and, pseudo-presentiment, the foretelling of a present situation (Neppe, 1983, pp. 8–9). The latter is reasonably seen as an after-effect of déjà vu, a feeling of familiarity in the absence of recollection produces a sense of foretelling once the déjà vu experience is recognised and integrated within ordinary consciousness. However this sense of foretelling is usually unaccompanied by any content apart from a sense of vague recollection. The effect is to re-establish conscious awareness in the present-time experience.

Explanations of Déjà Vu

Among scientific studies there is little data available about the precise nature of the déjà vu experience (Brown, 2003, p. 398). This may be partly due to the fact that the experience is qualitative, hard to locate in neurological terms, fleeting, not inconsistent with normality, and difficult to describe or replicate in quantitative experiments. According to Brown (2003), Moulin and Chauvel (2010), and Neppe (1983, 2010), explanations of déjà vu fall into four categories. These are (a) dual processing (two cognitive processes that are momentarily out of synchrony), (b) neurological (disruption in neural transmission or seizure), (c) memory-based (implied familiarity with unrecognised stimuli), and (d) attentional issues (unattended perception followed by attended perception; see Table 1).

While there is agreement amongst researchers that déjà vu is a routine cognitive experience unrelated to severe psychological disturbances, it is nevertheless possible that déjà vu, while involuntary, may in fact be a very useful response for objectivity normalisation. Thus while the common déjà vu experience is distinct from depersonalisation, psychopathology, and even ongoing dispositions such as mood fluctuations, working rhythms, and emotional sensitivity, there is some evidence that the experience of déjà vu is longer in duration and higher in frequency amongst people with these disorders (Brown, 2003, p. 396).

Table 1

The Four Categories of Explanation of the Déjà Vu Phenomenon

Dual Processing	Two cognitive processes which normally operate in synchrony become momentarily uncoordinated (out of phase)
Neurological	Brief dysfunction in the nervous system involving either a small seizure or alteration in the normal course of neuronal transmission
Memory	Memory and perception momentarily enfold one-another
Attentional–Inattentional	The ongoing stream of perceptual experience is divided into two separate perceptions through distraction or inattention

Dual-Processing Explanations

The dual-processing explanation asserts that there is a disruption in the operation of two separate but interactive cognitive processes. Mnemonic processes that operate in concert may become momentarily asynchronous with one being activated in the absence of the other (Brown, 2003, p. 402). Familiarity and retrieval are independent cognitive activities usually operating in synchronous parallel; hence recall is accompanied by familiarity of information retrieved. However, in déjà vu, retrieval can be activated in the absence of familiarity to become momentarily unfamiliar (*jamais vu*), or familiarity may be activated in the absence of retrieval (déjà vu). This dual process interpretation is supported by the earlier work of Bergson (1908) who posited that perception and memories are simultaneous events. The dual-process hypothesis is described by Mullarkey and Pearson (2002, p. 144) who asserted that, "memory is never posterior to the formation of perception: it is contemporaneous with it. Step by step, as perception is created, the memory of it is projected beside it, as the shadow falls beside the body." However, this hypothesis may fail to account for the persistence and complexity of memory. It may incompletely describe why any given memory selection may be retained over another or the differences between short- and long-term memory and the selective filtering and assembling of perceptual experiences within cognition. Alternatively, the "memory–perception" hypothesis of déjà vu may account for the cognitive experience of the memory of déjà vu after the experience has passed, unaccompanied by the physiological sensation of déjà vu itself.

Memory encoding and retrieval operate either on the basis of experiencing recollection or storing experience for recollection but seldom both at once. Consequently, when experiencing the déjà vu phenomenon, it is possible that memory encoding and retrieval can both be briefly active simultaneously — new experiences can briefly be encoded as familiar. However, Pashler (1994) has suggested that there is instead a dual mode model of attention, with a single process for memory encoding, memory retrieval, and response selection. Consequently, memory and encoding may not work in parallel, and memory is the outcome of whatever processing occurred as input.

Other theories of dual-processing imply that cognitive resources are usually focused on an out-going event, but distraction, inattention, or fatigue can lead to memory and perception enfolding in on one-another. In support of this, Hughlings–Jackson (1888) suggested that people have two varieties of consciousness — normal (which processes information from the outside world) and parasitic (or introverted — which processes thoughts and reflections of an inner mental world). When the activity of normal, extroverted consciousness is lessened by distraction, fatigue, or temporary seizure, the evaluation of incoming sensory information depends more on internal consciousness, which derives from experiences already held, hence a new experience is misread as an older experience. A problem with this hypothesis

is that it is difficult to imagine how a function of consciousness could be parasitic on other parts of consciousness. There are two forms of consciousness operating in parallel that may be combined in a perception of familiarity: straightforward perception of the environment (objective stimulation) and subjective reflection on internal experience (subjective stimulation). For déjà vu to occur, the processing of these two functions is momentarily combined in a state of fatigue, causing an apprehension of temporal displacement.

Neurological Explanations

The basic premise of neurological explanations is that déjà vu relates to brief and temporary neurological dysfunctioning characterised by a change or seizure in the flow of neural transmission from specific receptor sites in the brain: the hippocampus and temporal lobes. Halgren, Walter, Cherlow, and Crandall (1978) hypothesized that déjà vu results not from a decrease but from an increase in the electrical outflow of the hippocampal gyrus (the area of the brain involved in encoding and retrieval) and that this is qualitatively experienced as a misinterpretation of familiarity. Bancaud, Brunet–Bourgin, Chauvel, and Halgren, (1994) proposed that the inappropriate feeling of familiarity results from a nonspecific seizure of activity in the temporal lobe combined with current sensory input (the temporal lobe received information from both the visual and auditory cortices) so possibly either may be involved in the experience of déjà vu if these occurred coincidentally. As Wild (2005, p. 1) suggests, "the perceptual, mnemonic and affective regions of the lateral temporal cortex, hippocampus and amyygdala" are implicated as regions of the brain that are activated in the occurrence of déjà vu. A neural transmission delay from perceptual organs to the higher processing centres in the brain results in a slight increase in the time it takes to transmit a message due to temporary synaptic dysfunction — a slowing in routine processing time of several milliseconds. The experience of this is misinterpreted as what is actually new information experienced as old information (see Grasset, 1904). It is possible that a fatigued state underlies this slowing in neural processing time, which temporarily elongates the time between sensation and perception. A transmission delay involving two neural pathways rather than one seems to be the more cogent explanation.

Neural transmission delay is also the basis of another theory (Ephron, 1963; Humphrey, 1923) which posits that the primary perceptual pathway goes to the dominant brain hemisphere while the secondary pathway routes through the dominant and the non-dominant. When delay from a non-dominant hemisphere is extended, a déjà vu experience may result. Alternatively, an electrical excitation of one pathway in the dominant hemisphere may cause a temporal delay to be experienced in the secondary pathway — causing déjà vu.

Memory Explanations

Memory explanations may serve as the basis for theorising that implicit familiarity is the basis for déjà vu. If an individual processes information without paying conscious attention to the experience of processing information, subsequent processing may give rise to the sensation of objective familiarity in the absence of exact recollection, if the experiential processing conditions are very similar — thus déjà vu may reveal an iterative recursive quality (Corballis, 2011) to the experience of human thought and consciousness. Déjà vu is contrasted to other memory responses through a strong impression of familiarity in absence of explicit recollection.

O'Connor, Lever, and Moulin (2010) describe déjà vu as arising from "erroneous sensation of familiarity" (p. 118). Déjà vu differs from *déjà vecu* in so much as déjà vu experiences do not precipitate actions whereas *déjà vecu* experiences do and are therefore considered to be delusional. The neuropsychological substrates of the experience of déjà vu are considered to be distributed across the two functions of remembering and knowing. As O'Connor et al. suggest, remembering involves recollection from episodic memory and knowing with retrieval from semantic memory, the first requires effort and the second is automatic (2010, p. 119).

O'Connor et al. (2010) state that déjà vu derives from disruptions to the "temporal coding" that are produced by false signals of recall without retrieval, frequently in new perceptual contexts. This sensation follows from dissonance in "firing in hippocampal output neurons relative to the theta oscillation" (p. 118). This increased neural activity causes the sensations associated with retrieval to become dissociated from the act of retrieval itself (p. 119). The hippocampus is involved in reactivating the context associated with an event and recognition and recollection involve theta-coupling between the hippocampus and other neocortical areas. Theta coherence of brain-wave function is associated with the success of encoding and retrieval involving "synchronisation across spatially distributed networks" (p. 135). The basis of the model of neurological functioning causing déjà vu that O'Connor et al. propose is that increased theta coupling occurs both while the hippocampus is encoding and retrieving, producing the dual sensation of recall without retrieval (p. 138). More recently Bartolomei et al. suggest the specific regions involving increased hippocampal "theta coupling" are the anterior subhippocampal structures (involved in knowing) whereas remembering and retrieval require distributed stimulation across the medial temporal lobes (2011, p. 490). Brázdil et al. used a multivate neuroimaging technique termed source-based morphometry which revealed that amongst people who experience frequent non-pathological déjà vu there were mesiotemporal subcortical regions in which significantly less grey matter was present (2012, p. 1240). This is consistent with the findings of both O'Connor et al. (2010) and Bartolomei

et al. (2011) that alteration in hippocampal functioning results in changes of volume in transmission.

Speculation concerning implicit familiarity as a foundation for déjà vu was originally proposed by H. F. Osborn in 1884, who suggested that individuals process a considerable amount of information without paying full conscious attention to it and that subsequent reprocessing may occasionally give rise to a sensation of subjective familiarity in the absence of recollection. What sets déjà vu experience apart from other implicit memory responses is an inordinately strong impression of familiarity in the absence of explicit recollection. So, according to Osborn, it is not the specific content of memory encoded which activates the déjà vu but rather an experience of the cognitive processing which occurred on a separate occasion. However, other theories have posited a single element familiarity. One element that is perceived in the present environment may be objectively familiar but is unrecognised because it is experienced in a new or changed context. This gives rise to MacCurdy's (1925) term of restricted paramnesia. Sno and Linszen (1990) suggested a holographic explanation of déjà vu. Memories are stored as holograms; each memory corresponds to a unique pattern of neural activation involving entire cortex, hence memory is not based on storage but a unique wave form of activation. If perceptual elements in a new scene overlap with elements of previous memory, then this has the potential to reactivate an old memory (Brown, 1983, p. 406). MacCurdy (1925) speculated that there are two components of nominal recognition response — affective reaction followed by familiarity (cf. Zajonc, 1980): although two stages follow in quick and seamless succession — indistinguishable as separate processes — déjà vu results when the initial affective stage is not succeeded by a clear cut memory match. Fleminger (1991, p. 1418) suggested that affective and cognitive channels of information processing usually work in concert but that déjà vu results from "aberrant activity in the pathway responsible for affective interpretation of percepts." Linn (1953) suggested that anxiety evoked by some aspect of the present situation disrupts normal functioning of the reticular activitating system. Linn assumed that a change in arousal precipitates déjà vu, rather than a specific affect associated with a stimulus.

Attentional–Inattentional Framework

A fourth framework for déjà vu is that perceptual experience is divided into two separate perceptions as the result of distraction or inattention. Déjà vu is caused when perception under diminished attention is followed by perception under full attention, the juxtaposition of these two experiences results in the diminished perception being attributed to a more distant past (Brown, 2003, p. 407). Leeds (1944) termed this a "split attention phenomenon" and proposed

that a physiological reaction as subtle as an eye blink could divide these perceptions. Déjà vu has also been attributed to inattentional blindness (Mack and Rock, 1998). When a target stimulus is in periphery and the extraneous (ignored) stimulus is in the centre of the visual field (fovea), inattentional blindness is more likely to occur when a target stimulus is in the fovea and extraneous stimulus is in the periphery (Brown, 2003, p. 407). Momentary distraction from a stimulus that is later perceived more clearly elicits déjà vu. Dixon (1971, p. 106) suggested that during an initial brief stimulus exposure, inhibition by interference may cause parts of the stimulated field to interfere with the perception of other parts, consequently a second glance of a scene results in initial disinhibituation which then matches present perception. Déjà vu is difficult to re-create in laboratory or field experiments because it is almost impossible to stimulate the over-whelming sense of familiarity within a fleeting moment that needs to be concurrent with the realisation that the stimulus could not have occurred in the context of the present. Furthermore, it is difficult to separate any environmental stimulus on temporal lobe activity from the possibility it may have occurred under any circumstance (Neppe, 1983, p. 7).

Conclusion: The Purpose of Déjà Vu

Déjà vu, rather than only being a feature of memory anomaly, is in fact a purposeful function of cognitive processing. Most studies concentrate on defining déjà vu — either as a phenomenon of experience or as an occurrence of neurological plasticity. However, few of these studies mention that déjà vu is also a useful subjective experience. While the experience of déjà vu may be one of heightened perception of brief temporal displacement within conscious awareness, it re-orientates the experient to the subjective present and heightens the perception of the spatio-temporal experience by the perception of dissonance caused in its brief occurrence. This temporal moment is subjective in so far as the experience is qualitative and different from the normal experience of perceptual flow; it may even be a pleasant experience (the feeling of familiarity usually is). However, the experience of déjà vu is also an aid to objectivity in so far as the experiencer is forced to perform a cognitive "check" at its onset. As O'Connor and Moulin suggest, "the overall evaluation of the déjà vu-eliciting situation sides with the higher-order metacognitive awareness of inappropriate recognition — the outcome is that the experient is able to function normally, does not modify his or her behaviour based on the errant sense of recognition, and can be left with a sense of wonderment at this insight into the normally concealed machinations of his or her mnemonic decision-making processes" (2010, p. 165). The current article does not suggest that déjà vu gives cause for behaviour modification itself — but nevertheless the experience of déjà vu is a phenomenological aid to the framing of consciousness in experients. The value of déjà vu is as a by-product

of temporary over-excitation of hippocampal neurotransmission that re-orientates and re-familiarises the conscious state of the individual to a heightened awareness of the perceptual flow of her current physiological experience of environment.

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