

Time, Thought, and Consciousness

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State of consciousness and reflective awareness are intrinsically related, in that the different states of consciousness entail “specific forms — including absence — of reflective awareness” (Rapaport, 1951, p. 708). Both phenomena of consciousness would also seem to bear an important relationship with various forms of thought. What has not, hitherto, been explicated is the relationship among time, thought and consciousness, and we have set ourselves the goal of doing just that. While our primary focus is on a theoretical discussion of that intersection, we also incorporate some new empirical data that we have recently gathered, looking at thought (specifically “trance logic”) while swimming under water at depths in excess of 30 meters.

Keywords: states of consciousness, thought, trance logic

Thirty years ago, a landmark chapter was published by one of the major figures in cognitive psychology, arguing that consciousness was “respectable, useful, and probably necessary” (Mandler, 1975). That piece has been included in a book of readings (Baars, Banks, and Newman, 2003), and it remains as pertinent today as it did originally. Why is this so? George Mandler’s concluding paragraph, written in the heyday of that unfortunate marriage between “information processing” and cognition, reveals one reason, namely that the time (then, but also now) was ripe for returning consciousness back to the fold of cognitive psychology, especially given the way that the so-called cognitive revolution was being portrayed in American psychology:

The concept of consciousness was abandoned as a proper object of experimental study some 60 years ago. The reasons were manifold. The introspective method erred in assuming that consciousness could be made the datum of psychology or that verbal report was a royal road to its exploration. The failure of introspection both engendered behaviorism and failed to provide any viable alternatives. Others, like the Gestalt

school and the French and English enclaves, successfully defended their views of the conscious organism, but had, for theoretical reasons, little grounds to mount a major analytic attack. The return of American psychology to a theory-rich as well as experimentally rigorous stance has given us the opportunity to develop the proper theoretical tools to return consciousness to its proper place in a theory of thought, mind, and actions.¹ (p. 252)

Mandler's chapter is especially of importance to the present paper because he provides a fine analysis of the relationship between time, thought and consciousness — an analysis that, to the best of our knowledge, has been relatively ignored in the literature, while at the same time has been enthusiastically explored by the first author in a number of previous papers (Glicksohn, 2001b; Goodblatt and Glicksohn, 1989–1990). And it is also in this important respect that the piece remains as pertinent today as it did originally. What we intend to do in this paper is to continue along the lines of Mandler's thinking, reiterating the central place of consciousness for cognitive psychology — and, we might add, for cognitive neuroscience, especially given the prominence of the topic in some recent publications (Crick and Koch, 2003; John, 2002; Searle, 2000; Tassi and Muzet, 2001).

¹One should have no doubt as to where Mandler's real sympathies lay (Mandler, 2002); however, the study of consciousness seems to have been something of a captive slave to a consensually-accepted narrative of dubious authenticity. First, consciousness as a topic of study was in fact never abandoned, with major articles being published in the *American Journal of Psychology*, edited by Edward Bradford Titchener, in parallel to the ascent of behaviorism, up till the early 1920's (Downey, 1919; Hollingworth, 1911; Perky, 1910); in a number of major publications appearing during the war years (Duncker, 1945; Schilder, 1942), and after the war (Allport, 1955; Bash, 1949; Flavell and Draguns, 1957; Humphrey, 1953; Rapaport, 1951; Werner, 1948) — and well before Neisser (1967) heralded the *second* cognitive revolution, the first being that of Gestalt psychology (Allport, 1923/24; Ash, 1995; Henle, 1985; Köhler, 1947), which is conveniently forgotten, even though some of us have tried to rectify this (Goodblatt and Glicksohn, 2003; Greenwood, 1999). Secondly, the verbal report was, and is, widely accepted both as a criterion of consciousness (Lieberman, 1979; Radford, 1974; Smythies, 1999) and as a royal road to its exploration (Ericsson and Simon, 1980; Glicksohn, 1993; Pressley and Afflerbach, 1995; Valentine, 1978). Thirdly, the "failure" of introspection resurfaced in the debate on imagery (Anderson, 1978; Kosslyn, 1980; Pylyshyn, 2003), and it is now patently clear that there are individual differences here in subjective experience (Marks, 1977; Reisberg, Pearson, and Kosslyn, 2003; Richardson, 1999; Yuille, 1985), much as there were individual differences in this domain at the turn of the twentieth century (Brock, 1991; Holt, 1964; Humphrey, 1953). Fourthly, the Gestalt school could not present a viable alternative to behaviorism — or in fact to information processing — within American psychology, given the costs incurred in moving out of Nazi Germany and into an academically hostile American environment (Ash, 1992, 1995; Brock, 1994; Henle, 1993, 1997; King, Wertheimer, Keller, and Crochetière, 1994). Gestalt psychology, however, did make its influence on one *bona fide* brand of American psychology, namely the ecological school (Gibson, 1979; McCabe and Balzano, 1986; Shaw and Bransford, 1977; van Leeuwen and Stins, 1994), whose basic assumptions are diametrically opposed to those of information processing (Gibson, 1982; Mace, 1986). It is, therefore, perhaps inevitable that consciousness took so long to achieve the type of buzzword status in American psychology that it now holds (Dennett and Kinsbourne, 1992; Hilgard, 1980; Tulving, 1985).

Mandler (1975) adopted the constructivistic approach of Robert Ornstein (1969, 1975) to the study of duration, meditation and consciousness, and derived the following scenario: consider the notion of there being a conscious “frame” (i.e., that which is available to consciousness₃); consider further the fact that under “special conditions when the flow of consciousness stops, single frames enter into consciousness, and remain there However, such an experience should in fact be a very different form of consciousness; the normal form is the flow Given that the flow of frames is radically altered, one would naturally expect a similar and unusual change in duration experiences.”² In brief, Mandler has succeeded in tying together a change in information processing (content and rate of flow of the frames), with changes in both consciousness₆ and consciousness₄, coupled with a change in experienced duration.

Glicksohn (2001b) developed these ideas, in conjunction with an analysis of meditation provided by Brown (1977):

The more absorbed the subject becomes in his or her subjective experience . . . the slower time appears to be. Internal events seem to be flowing by in slow motion, as fewer subjective time units are accumulated . . . each of which is larger in extent Apparent duration breaks down as one becomes more and more absorbed in one’s subjective experience due to the lengthening of the subjective time unit, focusing on single “frames” of experience (Mandler, 1975) at the expense of their temporal integration The breakdown of apparent duration results in the experience of timelessness (pp. 9–12)

Conceivably, this state of affairs might be triggered by (or, be correlated with) “transient prefrontal cortex deregulation” (Dietrich, 2003), recalling that time estimation implicates the prefrontal cortex (Basso, Nichelli, Wharton, Peterson, and Grafman, 2003; Binkofski and Block, 1996; Rubia and Smith, 2004).

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The basic analogy that we shall draw is that between the construct of a *state* of consciousness (Tart, 1972) and that of a *level* or *stage* of cognition (Brown, 1977; Glick, 1992) — such an analogy being completely in line with Heinz Werner’s (1978a) orthogenetic principle of development, “. . . which states that wherever development occurs it proceeds from a state of relative global-

²Of all the various concepts of consciousness discussed by Natsoulas (1978), three are of present concern: what Natsoulas (1999) has termed consciousness₆, that is the sixth definition for consciousness given in the Oxford English Dictionary (1989), which refers to the notion of a “state of consciousness” (e.g., a meditative state of consciousness); consciousness₃ (Natsoulas, 1992), which refers to the state of being in immediate subjective experience (e.g., of being aware of the hum of the computer), and consciousness₄ (Natsoulas, 1994, 1997) which refers to being aware of being aware (e.g., of being aware of being aware of the hum of a computer as one contemplates the latter within a meditative state of consciousness).

ity and lack of differentiation to a state of increasing differentiation, articulation, and hierarchic integration" (pp. 108–109). Werner (1978b) argued that "An adult may perform at genetically differing levels, depending on the task or on inner circumstances" (pp. 339–340). A major exemplar of such "inner circumstances" would be a shift in consciousness.³ Indeed, just as one can envisage different forms of consciousness₆ constituting different states of consciousness (Natsoulas, 1999), so one can identify different forms of thinking (Leonhard and Brugger, 1998; Nisbett, Peng, Choi, and Norenzayan, 2001; Verbrugge, 1980), constituting qualitatively different modes of expression and comprehension (Franklin, 2000; Werner and Kaplan, 1963), that are linked to these (Glicksohn, 1998; Werner, 1948).

A number of authors have stressed that different states of consciousness entail changes in thought *and* changes in time perception (Dietrich, 2003; Shanon, 2002; Wackermann, Pütz, Büchi, Strauch, and Lehmann, 2002), and some of these have also referred to a concomitant impairment in reflective awareness.⁴ Arnold Ludwig (1966), in particular, notes that in "altered" (or "alternate") states of consciousness, "Archaic modes of thought (primary process thought) predominate, and reality testing seems impaired to varying degrees. The distinction between cause and effect becomes blurred, and ambivalence may be pronounced whereby incongruities or opposites can coexist without any (psycho) logical conflict. Moreover, as Rapaport and Brenman have commented, many of these states are associated with a decrease in reflective awareness." And also: "Sense of time and chronology

³Consciousness₆ is an emergent property of a gestalt phenomenon, namely the psychophysiological state of the organism (Glicksohn, 1998, 2001a); and consciousness₃ itself is an emergent property of cognition (Lehar, 2003); therefore, being sandwiched between the two, one could argue that consciousness₄ should also be an emergent property of such a system. Irrespective of this, consciousness₄, otherwise referred to as self-awareness (Natsoulas, 1998), reflective awareness (Rapaport, 1951), self reflexivity or reflexivity (Blagrove, 1996), is a dimension which fluctuates as one's state of consciousness becomes altered. To quote David Rapaport here: The different states of consciousness entail "specific forms — including absence — of reflective awareness" (1951, p. 708). This, we shall argue, will have implications for both the *type* and *mode* of thought process exhibited in altered states of consciousness (Glicksohn, 1998, 2001a).

⁴Undoubtedly, if much of cognition is unconscious (Dehaene et al., 1998; Greenwald, 1992), then thought can also be unconscious (Epstein, 1994). However, given our own reliance on the verbal report for assessing both change in state of consciousness — be this by means of interview (Glicksohn, 1991), systematic self observation (Glicksohn, Friedland, and Salach-Nachum, 1990–91), questionnaire (Glicksohn and Barrett, 2003), or a verbal probe (Glicksohn and Avnon, 1997–1998) — as well as problem solving on-line (Goodblatt and Glicksohn, 2002) — in this paper we necessarily focus on conscious₃ thought. In any event, we are referring to the act of "going beyond the information given" (Bruner, 1957), which can entail creative (Lubart and Getz, 1997), metaphoric (Ambrose, 1996) or productive thought (Wertheimer, 1959), and which at the very least is presentational (Hunt and Popham, 1987; Silberer, 1951), figurative (Gibbs, 1994; Nerlich and Clarke, 2001), and experiential (Franklin, 2000; Gloor, 1990).

becomes greatly altered. Subjective feelings of timelessness, time coming to a standstill, the acceleration or slowing of time, and so on, are common. Time may also seem of infinite or infinitesimal duration" (pp. 227–228).

Consider the following terminology: *mode* of thought refers to a distinction that has been drawn between a literal and a metaphoric–symbolic way of thinking (Glicksohn, 2001a; Verbrugge, 1980), or between a rational and a narrative way of thinking (Bruner, 1986; Newman, 1997); *type* of thought brings to mind various attempts in the literature to impose a typological or stylistic conception, distinguishing between an imagistic and a verbal format for thought (Gale, Morris, Lucas, and Richardson, 1972; Riding, Glass, Butler, and Pleydell–Pearce, 1997); by *logic* of thought, we are implicating what others have termed “trance logic” (Spanos, 1986), or “dream logic” (Haskell, 1986) or “state logic” (Kahn and Hobson, 2005).

How do mode, type and logic of thought interrelate? A look at a boundary case will be instructive. In the dream, abstract thought is concretized (Hunt, 1989; Kilroe, 2000), presumably because of some change in prefrontal brain functioning (Dietrich, 2003; Muzur, Pace–Schott, and Hobson, 2002). This may be in terms of an imagistic or pictorial format (Tolaas, 1986). Such a format can well serve the goal of providing a suitable medium for metaphoric–symbolic thought (Marks, 1996; Silberer, 1951). The dream also follows its own logic (Haskell, 1986; States, 2000), and given that the dreamer usually gets wrapped up in the events unfolding, the dream experience conforms to a hallucinatory one (Mahowald, Woods, and Schenck, 1998). But even when the dreamer becomes aware that he or she is dreaming, that is, in a lucid dream (LaBerge and Gackenbach, 1986), invariably the dreamer still flows with the dream logic (e.g., now I can fly; how nice!). Thus, in some states of consciousness, this particular combination of mode, type and logic of thought will predominate.⁵

If a change in state of consciousness results in a developmentally earlier level of cognition (in the Wernerian sense), one in which thought, feeling, imagery and perception are less differentiated, then one may also expect conjoint changes in mode, type and logic of thought, coupled with a change in reflective awareness. In short, such dedifferentiation, according to Werner (1978a)

⁵There is also the question of whether “altered-state” thought is radically different from, as opposed to lying on the same underlying dimension as, ordinary–waking thought (McCreery and Claridge, 2002; Prentky, 2000). Again, individual differences are rampant here (Crawford, 1994; Glicksohn, 2004). Furthermore, especially with respects to dissociation (Butler, Duran, Jasiukaitis, Koopman, and Spiegel, 1996) and hallucinatory experience (Bentall, 2000), one camp espouses a dimensional approach (Freedman and Marks, 1965; Kahn and Hobson, 2005), while the other promotes a taxonomic approach (Ogawa, Sroufe, Weinfield, Carlson, and Egeland, 1997; Simeon, Knutelska, Nelson, Guralnik, and Schmeidler, 2003).

... is developmentally prior to one in which there is a polarity of subject and object. Thus the young child's acceptance of dreams as external to himself, the lack of differentiation between what one dreams and what one sees, as found in psychosis, or in some nonliterate societies, the breakdown of boundaries of the self in mescaline intoxication and in states of depersonalization — all of these betoken a relative condition of genetic primordiality compared to the polarity between subject and object found in reflective thinking. (p. 109)

The dreamlike (Goldberger, 1957; Smith, 1999) or hypnagogiclike (Bertini, Lewis, and Witkin, 1972; Mavromatis, 1987) quality of such mentation implies the following: (1) the concretization of abstract thought (Kilroe, 2000; Lothane, 1982), particularly within the framework of metaphoric-symbolic imagery (Hunt, 1989; Schacter, 1976); (2) the accompanying reduction in reflective awareness results in a basic inability to “escape” from the confines of such mentation, and thus renders the whole experience (state of consciousness and mode of thought) as comprising a trance experience (Gurstelle and de Oliveira, 2004; Lothane, 1982; Plotkin and Schwartz, 1982); (3) such thought will necessarily follow its own logic (trance or state logic; Kahn and Hobson, 2005; Spanos, 1986). As Dietrich (2003) writes,

The neutralization of specific prefrontal contributions to consciousness has been aptly called “phenomenological subtraction” by Allan Hobson The individual in such an altered state operates on what top layers remain. In altered states that cause severe prefrontal hypofunction, such as non-lucid dreaming or various drug states, the resulting phenomenological awareness is extraordinarily bizarre Phenomenologically, dream stories are void of prefrontal-dependent cognition. Self-reflection is absent . . . time is distorted with past, present, and future freely exchanged . . . and volitional control is greatly diminished (p. 238)

It is further of importance to note that such state, or trance logic, can well result in either subsequent or prior rationalization (Marcuse, 1976) or confabulation (Johnson, Hashtroudi, and Lindsay, 1993), as the individual attempts to reconcile her behaviour with the consensual notion of there being an intention to behave in such a manner. Thus, a posthypnotic suggestion to open a window on being given a signal may be executed while the individual casually remarks “it is hot in the room.” Note that state-dependent thought needs no immediate self-generated justification, because aberrations in thinking are not recognized as such on-line.

Trance Logic in Nitrogen Narcosis

We can report on some preliminary data supporting these ideas. Our empirical study was concerned with the change in thought and change in time perception that might be experienced by deep sea divers (Charles, Allimann, and Ragot, 2001). The breathing gas most commonly used during diving contains

a large proportion of nitrogen, an inert gas that causes a narcotic effect when breathed at an ambient pressure of 4 ATA (absolute pressures) or more (Pastena, Faralli, Mainardi, and Gagliardi, 2005), that is, while swimming under water at depths in excess of 30 meters. This narcotic effect, which is known as “rapture of the deep” or “nitrogen narcosis,” is similar to intoxication from alcohol (Tetzlaff and Thorsen, 2005). In general, symptoms of nitrogen narcosis can include cognitive disorientation, drowsiness, unexplained laughter, feelings of euphoria, hallucinations, motor slowing, loss of awareness, aggressiveness, and finally, loss of sensation (Nevo and Breitstein, 1999). The change in thought — and, indeed, the change in state of consciousness — that may be experienced while swimming under water at depths in excess of 30 meters is worthy of study, as indicated in a recent review (Vaitl et al., 2005, p. 103). In particular, we were on the lookout for examples of trance logic underlying the shift in state of consciousness. We were also interested in investigating changes in time perception concomitant with this. The latter data are reported elsewhere (Lipperman–Kreda and Glicksohn, 2006).

Interviews were carried out by the second author in individual meetings with the participants. Each interview lasted approximately 30–40 minutes, was recorded and subsequently transcribed. In each interview, the participant was asked to tell us about two interesting dives they had had: one being a shallow dive (up to 20–25m) and the other a deep dive (in excess of 30m). During the course of the interview, we focused on the participant’s thought, feeling and behaviour in connection to some critical incident that was recalled.

Two of the participants (R and A) related the same “weird incident” that occurred on a dive they had taken together (deep sea diving is never a solo affair), and presents a wonderful example of trance logic. Table 1 provides their reports side by side.

The phenomenon of nitrogen narcosis is well known to the divers — both of whom are very experienced — and it is because of this that they set up a diving protocol (“. . . we always plan in advance what we’ll be doing during the dive”). This, in turn, entails for both of them a well-functioning time-based prospective memory (“how much time we’re going to spend at that depth. The whole process is agreed upon between us and we carry out this protocol and don’t deviate . . .”), based on which they will eventually make their ascent — presumably adopting some test–wait–test–exit plan (Glicksohn and Myslobodsky, 2006), which must somehow compensate for the general “slowing down” underwater (Brooke and Ellis, 1992, p. 180), which we view as implicating a slowing down of the internal clock (Lipperman–Kreda and Glicksohn, 2006) [“About 5–6 minutes pass at that depth, which was over and beyond the original plan . . .”], though this is a debatable point (Ross, 1989). Yet, with each passing second at that depth, their state of consciousness becomes altered (“. . . and with every second that passes you become more and more stupid”), as does their thinking.

Table 1
Trance Logic in Nitrogen Narcosis While Diving

Diver R	Diver A
<p>... And after about 20 minutes, I look down and see something falling, not close to me, something like 20–30 meters away. I see a tank falling, and I say to A, “see a tank has fallen, come quickly and we’ll dive down together.” And A is convinced that I’m joking with him And he tells me to stop fooling around and to continue swimming. [Question: <i>When you saw the tank, were you in the water?</i>] We were in the water. I looked down, for a split second I saw something disappearing in the deep In retrospect, it was my tank that got loose — I had a spare tank on me that got loose. But I didn’t feel anything . . . and I said to A . . . “a tank has fallen down,” and he checked himself and said “what are you fooling around? Stop it . . . we’ll swim”</p>	<p>... The narcosis in itself isn’t the problem — the problems arise from the mistakes that one makes as a result of the narcosis. Now, most people can’t identify a state of nitrogen narcosis, but I know very well how to identify that I’m in a state of narcosis I know I have to function, because our dives are dives which are planned ahead of time. Therefore, we always plan in advance what we’ll be doing during the dive, how much time we’re going to spend at that depth. The whole process is agreed upon between us and we carry out this protocol and don’t deviate</p>
<p>Okay, we went down We made checks at 2 meters, 5 meters, 10 meters — just to see that everything’s okay, that there are no mishaps, that everything’s okay . . . from the moment you reach a depth of 30 to below 50 meters, the feeling is very, very nice, but you keep in mind . . . the goal and so you stay very, very focussed, because you know that the minute you go further down from 30 meters there’s also the narcosis, and the minute you get to 50 it’s much stronger I also have responsibility for my partner, I see</p>	<p>... and suddenly he says to me, “oof your tank has fallen.” Now I had . . . 4 tanks: 2 on my back and 2 at the side. Nothing fell from my back, I touch my sides and see that everything’s okay. I tell him “stop fooling around” . . . I know these tricks We begin our dive according to protocol.</p>
	<p>... So we begin our dive and we get to the specific site that we decided on in our protocol, and suddenly I see from afar something yellow upside down on the sea bottom I say, “something interesting, let’s move closer.” It is within the scope of our depth and within our time frame. No problem, and I see a tank. I say “great, now that’s something which I have yet to find in the sea.” . . . In short, I get there and I say “wow, a new tank” and I look and, wow, it belongs to our club . . . great . . . and I think that it might have fallen . . . from a passing boat . . . could be they</p>

Table 1 — Continued
Trance Logic in Nitrogen Narcosis While Diving

Diver R	Diver A
<p>that he's okay, he sees that I'm okay . . . and then we . . . go down Suddenly I see A indicating to me over there — pointing with his hand — and I see a tank standing up, and it was just like seeing a mirage. As if by a miracle, we're looking from afar and see a tank exactly like our own, a spare tank with the same markings . . . and with the same name of the diving club — it was as if God had sent us a tank. We were so excited</p>	<p>made a technical dive and it fell, and because it's deep, no one would go down to retrieve the tank, no one. And I'm pleased and R is even more pleased, and we shake hands — wonderful</p>
<p>. . . and I say to myself "what a wonderful thing, now we have a spare tank" . . . I'm already running in my head how we'll hide it from the club and other such nonsense. We felt so lucky to dive just here and to find . . . a tank. It was incredible About 5–6 minutes pass at that depth, which was over and beyond the original plan, and with every second that passes you become more and more stupid — I have no other definition for it, because it simply seems at some stage to be quite logical to find a tank just like the one we had there, that it was clear that this was a treasure of the sea — whoever finds keeps . . . and we slowly rise up, and while rising up you think about . . . the tank and it still seems reasonable at around 50 that this is truly a spare tank</p>	<p>. . . and I say "good, let's retrieve the tank" . . . and I say "where am I going to attach it, I already have 4 tanks" . . . we couldn't have asked for something better than this. Maybe we'll even use it to breathe with . . . maybe we'll gain another half hour of diving. Okay. I also imagine how G will be just pleased that I'm returning a tank that the club had lost. Okay, so we begin our ascent</p>
<p>. . . at about 20 meters I look at A's equipment, and I see that he has 4 tanks on him, and I check myself because something suddenly now doesn't look quite right, and suddenly I really see that I'm missing a tank At some point I indicate to him that "look, it's my tank" — and he looks and indicates "yes" . . . you have more time to think, and I couldn't understand how throughout that time we had made such a gross error . . . it bothered me . . . it was like being retarded . . . and when we got out of the water we discussed this, and we said that you simply become stupid</p>	<p>. . . We reach 20 meters and then the narcosis ends . . . 3 or 4 breaths and suddenly poof, you feel it. Suddenly, everything gets clearer, really clearer. And then I say, "wait, how come we have another tank?" Let's see how many tanks does R have? and I count and see, he has 2 tanks and I point to him "you idiot!" . . . I'm dragging 5 tanks here and you have only 2 [Question: <i>When you were down below, didn't you consider that R had told you that he had dropped a tank?</i>] No, not at all, didn't cross my mind — rather, it's wonderful to find a tank, it was the most natural thing that could be. [Question: <i>That was the most natural and real thing for that moment?</i>] Yes. It was only at 20 meters that I understood that we had found our own tank</p>

Indeed, given the similarity to alcohol intoxication — one means of inducing a trance state (Winkelman, 1986) — their process of decision making becomes as impaired as that of those suffering from alcohol myopia (MacDonald, Zanna, and Fong, 1995). In fact, the reports appearing in Table 1 bear telltale signs of a dreamy state of consciousness (Meares, 1999). Note especially the use of the word *suddenly*, which characterizes both the abrupt shifts in content or context of such an altered state and/or of the transition from one state of consciousness to another, as well as its cinematic depiction (Bulkeley, 2003). In short, the two divers are in a trance state governed by trance logic, wherein, according to Ludwig (1967, p. 13)

. . . “primary process” or more primitive forms of thinking become manifest. The person no longer seems bound to the necessity for syllogistic reasoning, the distinction between cause and effect may vanish, the notion of time may become more relative, opposites can coexist and not seem contradictory, feelings of omnipotence or mental impotence may appear, and *deus ex machina* explanations are more apt to be accepted.

What should certainly make a diver suspicious that something is not quite in order is finding a tank that is exactly the same as one’s own (see Table 1). That is, unless one is experiencing nitrogen narcosis. Thus, note the depiction of the tank: “and it was just like seeing a mirage. As if by a miracle, we’re looking from afar and see a tank exactly like our own, a spare tank with the same markings . . . and with the same name of the diving club — it was as if God had sent us a tank. We were so excited” More importantly for the present concern, note the trance logic underlying their thinking which captivates both divers, in a nonpathological *folie à deux*: “because it simply seems at some stage to be quite logical to find a tank just like the one we had there, that it was clear that this was a treasure of the sea — whoever finds keeps . . . and we slowly rise up, and while rising up you think about . . . the tank and it still seems reasonable at around 50 [meters] that this is truly a spare tank” Not that suspicions are not in the background, or fringe of consciousness (“great, now that’s something which I have yet to find in the sea”) — these simply play no cautionary role in the narrative unfolding in real time.

As they make their ascent, and their state of consciousness changes once again, so does their thinking: “at about 20 meters I look at A’s equipment, and I see that he has 4 tanks on him, and I check myself because something **suddenly** now doesn’t look quite right, and **suddenly** I really see that I’m missing a tank”; “We reach 20 meters and then the narcosis ends . . . 3 or 4 breaths and **suddenly** poof, you feel it. **Suddenly**, everything gets clearer, really clearer. And then I say, ‘wait, how come we have another tank?’ Let’s see how many tanks does R have?” Recall that at the beginning of the dive, R had said “see a tank has fallen, come quickly and we’ll dive down together.” However, neither A nor R later considered that this might be the tank that R

had mentioned. When the second author asked A if, on finding the “new” tank, he didn’t consider that R had told him that he had dropped a tank, he replied: “No, not at all, didn’t cross my mind — rather, it’s wonderful to find a tank, it was the most natural thing that could be.”

As the effect of nitrogen narcosis subsides, reality testing is recovered. As R suggests at the end of the interview, “you have more time to think.” This brings us back full circle to our point of departure in this paper, namely that with change in state of consciousness, there is a concomitant change in time perception, thought, and capacity for reflective awareness. The implication that we wish to stress, therefore, is that the study of consciousness behooves the study of the three-way relationship of time, thought and consciousness. Some might argue that instead of one problem, there are now three: the relationship of thought and consciousness (Cytowic, 2003; Glicksohn, 2001a; Hunt, 2005); that of time and consciousness (Glicksohn, 2001b; Varela and Depraz, 2005); and that of time and thought (Atance and O’Neill, 2001; Boroditsky and Ramscar, 2002). We would venture to suggest, however, that if one considers the *gestalt* of time, thought and consciousness, as we have done in this paper, then these three problems might be condensed into one.

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