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Knots and Consciousness: Knotted Models Applied to Uriah Kriegel’s “Consciousness, Permanent Self-Awareness, and Higher-Order Monitoring”

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Abstract: This paper is a response to Uriah Kriegel’s “Consciousness, Permanent Self-Awareness, and Higher-Order Monitoring” (Kriegel 2002) interpreted with my knot models of consciousness. In his paper, Kriegel argues that permanent self-awareness accompanies every conscious state, which I present in a trefoil knot model that provides some features of consciousness which were not captured in the pre-existing models of consciousness. By doing so, I will also show that the core of the consciousness discussion is related to the structure and the relationship between the observing and the observed self.

1. Introduction

1-1. Consciousness, Self-Awareness, and Knots

This paper is a response to Uriah Kriegel’s “Consciousness, Permanent Self-Awareness, and Higher-Order Monitoring” (Kriegel 2002) interpreted with my knot models of consciousness. Kriegel refers to the phenomenon that one with a conscious experience is aware of oneself as the experience owner having *permanent self-awareness* which is differentiated from introspective awareness (Kriegel 2002, 518). The main object of a permanent self-awareness involving experience is whatever external condition is experienced, while the main object of introspective awareness is the subject’s internal experience (Kriegel 2002, 518). One of the differences between these two phenomena, Kriegel explains, is that permanent self-awareness accompanies every conscious state, while introspective awareness is rare (Kriegel 2002, 519). The other difference is that the focus of the experience of introspective awareness is directed at oneself,

while permanent self-awareness is typically a peripheral component of conscious state, which means one's awareness of oneself as the experience owner remains peripheral (Kriegel 2002, 519). Permanent self-awareness is not introspective this way – in the way that it consumes the subject's attention (Kriegel 2002, 519). However, a single state cannot involve permanent self-awareness, rather there is a temporally extended, permanent self-awareness (Kriegel 2002, 520). And each particular mental state takes part in this stretch of self-awareness (Kriegel 2002, 520). Therefore, even if a particular state does not permanently involve self-awareness, the self-awareness it involves is permanent. This is what Kriegel refers to as “a state involving permanent self-awareness” or “a permanent self-awareness involving state” (Kriegel 2002, 520).

I second Kriegel's argument and will try to visualize his models anew by utilizing knots, which could capture some features of consciousness that were not so clearly presented or slipped out in the pre-existing models provided by Kriegel. But why knots? What can knots say, or rather, *show* about consciousness? Following the progression of Kriegel's arguments, I will summarize and introduce his models of consciousness and show the possibility of applying my knot-models to his consciousness model. And in the end, I will present the trefoil knot as an alternative model of the structure of consciousness, which is a state involving permanent self-awareness.

1-2. The Paradox of Self: Problem of the PSA Model

One could still ask though, why consciousness? Or rather, knots and consciousness? Consciousness indicates an awareness of something, either awareness of an object or awareness of self. Being aware of something is related to, roughly speaking, knowing and knowing that we know. The act of seeing as the most primitive perception represents this 'knowing' as being aware. This seeing is not only seeing an actual object in reality, but it includes the meta level of seeing, which points at self-observation. This means seeing myself, or seeing myself seeing (an object).

Observation is the beginning of not only understanding, but also understanding understanding in knot-theory-represented topological space. Knots and consciousness share their fundamental domain in the act of seeing, therefore, knots could be useful for mapping the theoretical models of consciousness.

Self-observation presumes the differentiated self, which means that both the self that is seeing and the self that is seen, exist. The problem of the pre-existing consciousness models is that they do not show this relationship nor explain the act between these differentiated yet identical self(s).

(a) Self (the observing) = Self (the observed)

(b) Self (the observing) \neq Self (the observed)

*(a) and (b) are the same and different at the same time.

What we need to be able to represent is a structure of self that is two-fold.

(1) Seeing (one)self always comes with seeing not-self.

Therefore, this is a two-layered seeing: seeing an object (not-I) and seeing myself (I). This *seen self* is always an othered self.

(2) Seeing an object always comes with seeing myself. (Permanent Self-Awareness)

(Even if we are not necessarily aware of this meta-seeing (seeing myself) every time I see an object.)

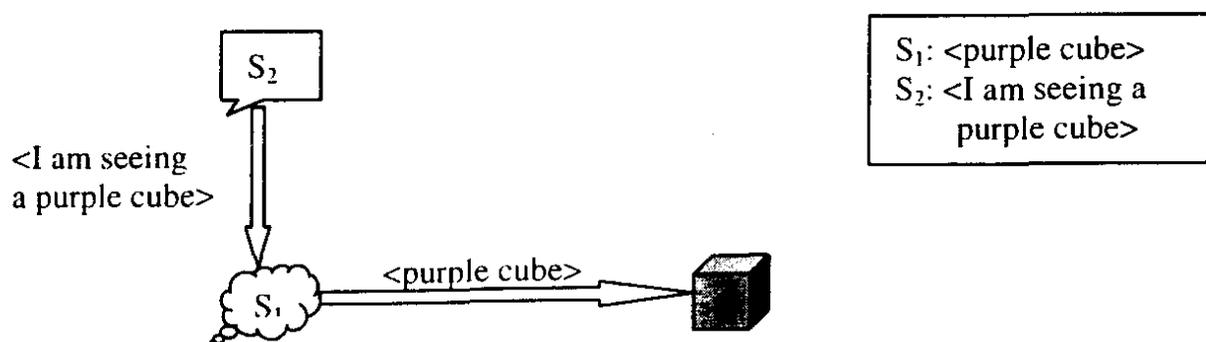
These two are fundamentally linked. Or, it could be stated they are two contents of one and the same mental state. This paradoxical structure of self in the process of “self-awareness” is not captured in the PSA models. It is difficult to visualize this, because (1) it is in the structure of a paradox, and (2) the double layers of one process need to be presented intertwined. The one layer is the structure of the observer and the object, and the other is the intrinsic structure of self both as the observer and the observed. Each layer could be presented and connected to the other, while each layer is still presented as a separate mental content. This connection is weak, i.e. external. The connection of these two different things does not guarantee that these contents are the two contents of one and the same state. With knots, however, it is possible to visualize (1) the paradox model, and (2) the multi-layered relationship in a unitary structure (process as a whole).

2. A Higher-Order Monitoring Model of Permanent Self-Awareness

Kriegel introduces a Higher-Order Monitoring model of permanent self-awareness (Kriegel 2002, 520). It is yet to be proven whether the Higher-Order Monitoring theory can be successfully

interpreted as an illuminating model of permanent self-awareness (Kriegel 2002, 520). According to Higher-Order Monitoring theories, for my experience of an object to be conscious, is for it to be accompanied by a suitable second-order state representing it (Kriegel 2002, 520). In this context, however, the second-order state must be both roughly simultaneous with the first-order state and formed non-observationally and non-inferentially (Rosenthal 1990, also see Kriegel 2002, 520). Higher-Order Monitoring theorists are still divided as far as their interpretation of what kind of second-order state this might be. According to Higher-Order Perception theory, second-order state is a perception-like state, while for Higher-Order Thought theorists, it is a thought (Kriegel 2002, 521). Here, Kriegel focuses on David Rosenthal’s Higher-Order Thought account.

Let’s say there is a purple cube as an object of a conscious experience. “According to Rosenthal, having a conscious experience of a purple cube is a psychological structure involving the concurrence (more or less) of two mental states” (Kriegel 2002, 521): first-order state (S_1) and second-order state (S_2). The content of a first-order state is *purple cube* and the content of a suitable second-order state is *I am seeing a purple cube*. S_2 represents not only the occurrence of S_1 , but also its occurrence in the subject. “This means that having conscious experiences requires the possession – and deployment – of a concept of self” (Kriegel 2002, 521). Kriegel applies this aspect of the theory to account for permanent self-awareness. The idea is that S_1 involves permanent self-awareness because it is accompanied by a mental state that represents its occurrence in the self (Kriegel 2002, 521) as described explicitly by Rosenthal: “A strong intuitive connection obtains between being in a conscious state and being conscious of oneself. [...] Higher Order Thought theory explains the phenomenon [...] successfully, since one’s Higher Order Thoughts refer to oneself” (Rosenthal 1990, 744-45; see also Kriegel 2002, 521).



Kriegel visualizes this as below (Kriegel 2002, 521).

Figure 1¹

2-1. Layers of Cognition

When one regards these different states as *layers* of cognition, or what happens in consciousness, the question would then be how they are structured – in this case, layered. These layers should *belong to* one’s consciousness. Note that here the notion of belongingness plays a key role. I regard these two different states of the same act as two states that belong together to one and the same mental act. Before we talk more about this *belongingness*, let me try to visualize this layered structure. A picture of these layers could show the belonging relationship between the two states, namely that they are actually the two states of one mental act. Layers visualize the wholeness of this process better than the other model with only arrows on an infinitely open plane.²

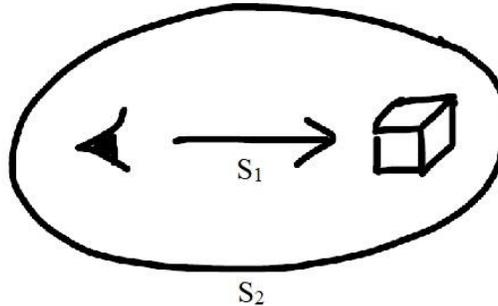
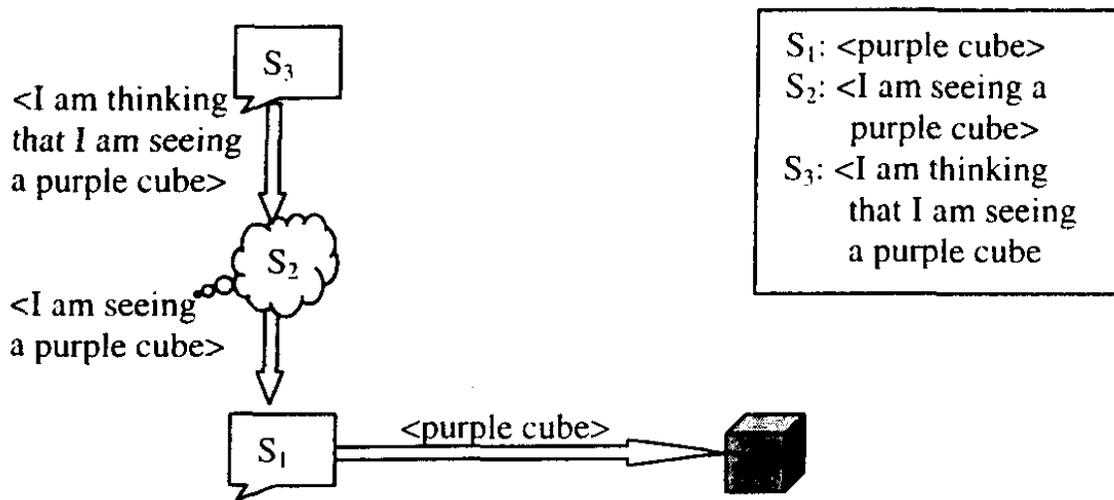


Figure 2

¹ “Figure 1. Permanent self-awareness in the HOT model” (Kriegel 2002, 521).

² It is also because layers provide *borders* which illuminate the distinctive ontological status of consciousness itself as the subject of the perceived, differentiating itself from the perceived (observed), yet in the perceived as part of themselves as well.

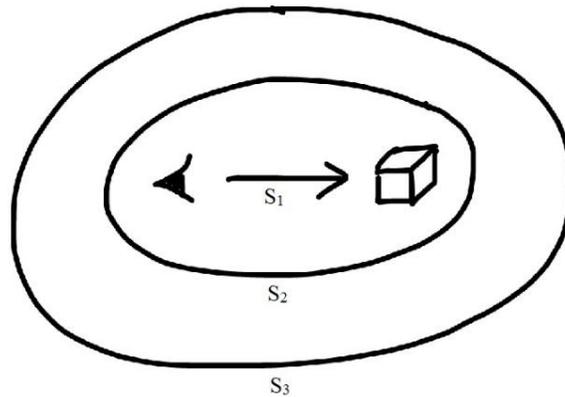
Kriegel points out that a Higher Order Thought model accounts for the difference between permanent self-awareness and introspective awareness (Kriegel 2002, 521). The problem of this model is, however, that in this model, S_2 represents the property, an extrinsic property of S_1 which makes S_1 involve permanent self-awareness. Therefore, S_2 itself is not conscious (Kriegel 2002, 521). Kriegel shows that a third-order thought (S_3) is required, for S_2 to be conscious (Kriegel 2002, 521). This is what happens in cases of introspective awareness (Kriegel 2002, 521). This means that one has a second-order thought as “I am seeing a purple cube” accompanied by a third-order thought as “I am thinking that I am seeing a purple cube” (Kriegel 2002, 522). And Kriegel presents the following figure to visualize this structure (Figure 2,



Kriegel 2002, 522).

Figure 3³

³ “Figure 2. Introspective awareness in the HOT model” (Kriegel 2002, 522).



Again, here is my layer-version of this structure of different states.

Figure 4

2-2. Belongingness (Mutuality) of the Layers

This model, however, comes with two conspicuous defects. First, in the case of the conscious experience of the purple cube, in this model, “neither the monitoring state S_2 nor the monitored state S_1 is in and of itself conscious. The consciousness of S_1 derives from its embedding in a relational structure, it is not intrinsic to it. Taken out of this structure, S_1 becomes non-conscious. But if neither S_1 nor S_2 is in itself conscious, then it is conceivable that there should be a zombie who harbours both states but has no PSA [permanent self-awareness] whatsoever” (Kriegel 2002, 522). Second, “the second-order state S_2 , in virtue of which S_1 is conscious, is itself a non-conscious state. So, the fact that S_2 represents the self does not imply that, by having S_2 , the self is conscious of itself, for S_2 is not a conscious representation of the self” (Kriegel 2002, 522-523). Taking into consideration that consciousness of self requires that the self be in the content of a conscious state, there is no real self-awareness in the Higher Order Thought model, because this model attributes to the subject a presentation of itself, but a non-conscious one (Kriegel 2002, 523).

If these problems are interpreted in the *grammar of belongingness*⁴, whether the layers of orders – states – are in themselves conscious, the question is whether the layers *belong to* each other – for instance, the layer S₁ belongs to S₂, and S₂ to S₃, or in a reversed way – and/or if they *belong to* one’s consciousness. The inevitable temporal gaps between different layers, monitoring and monitored states, must be somehow reconciled in order to guarantee the consistency and the identity of these layers as layers of one’s conscious experience as *a whole*. In other words, these separate layers need to *belong* together to constitute a conscious experience. And this *belongingness* resolves the difference of the temporal gaps.

3. The Brentanian Model of Permanent Self-Awareness

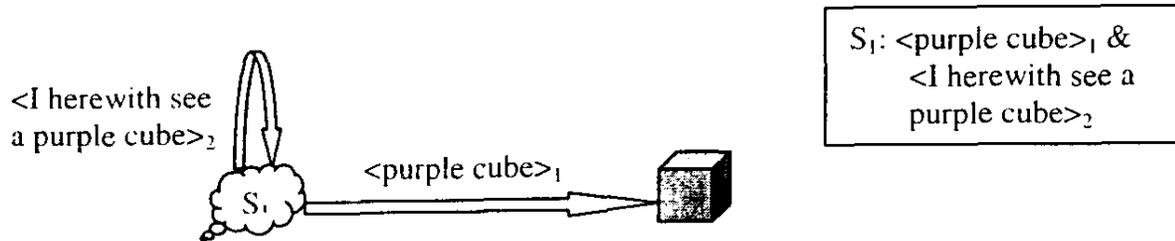
3-1. Permanent Self-Awareness and Introspective Awareness in Brentano’s Model

The *belongingness* solution can be better applied and represented in accordance with the next model that Kriegel presents, a model that preserves many of the theoretical resources of the Higher Order Thought model but still attempts to satisfy the further demands, namely the Brentanian model of permanent self-awareness (Kriegel 2002, 523). Kriegel explains that “according to Brentano, a conscious experience of a purple cube has two representational contents. The primary content is given by the purple cube. The secondary content is given by the experience of the purple cube. Thus, the experience represents primarily the cube and secondarily itself. More specifically, it represents itself precisely as a representation of the cube, and its primary content is embedded in its secondary content. Thus, the representation of the cube, and the representation of the representation of the cube, are wrapped up together in *a single mental act*” (Kriegel 2002, 524; emphasis added). Therefore, this experience is both a perception of itself and a thought about itself (Kriegel 2002, 524). The emphasis lies on “all wrapped up together in a single mental act” (Kriegel 2002, 524). In other words, they *belong* together to a single mental act.

Kriegel shows this in the following figure (Figure 3, Kriegel 2002, 525) and explains: “Whatever the subject’s experience is primarily directed at (whether the sight of a purple cube or the sound

⁴ The notion of belongingness in knot logic is to be discussed in a detailed manner in a separate paper, “An Application of Kauffman’s Knot Logic to the Brentanian Model of Permanent Self-Awareness.”

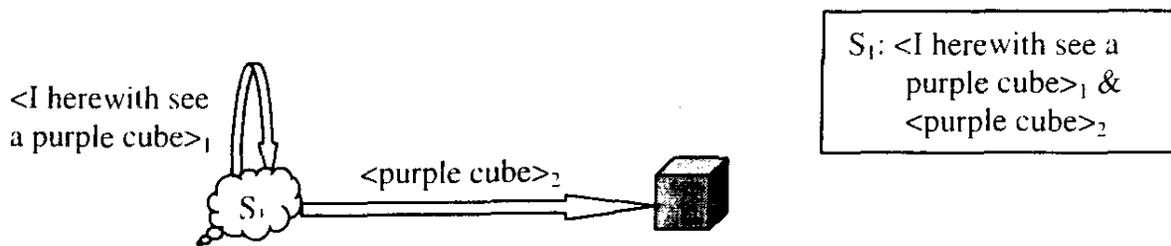
of a bagpipe), it is also (therewith) directed at the fact that the subject is having such an experience (see Figure 3). Hence, the subject's permanent self-awareness. In the Brentanian



model, then, an experience is conscious just in case it represents (secondarily) that the subject herself is having that very experience” (Kriegel 2002, 524-525).

Figure 5⁵

This self-awareness involved in ordinary conscious experience is differentiated from introspective awareness, because the self-awareness experience represents itself only secondarily, while introspective awareness would be awareness in which the mental act would be its own primary object, according to Brentano (Kriegel 2002, 525). Introspective awareness in



Brentano's model looks as below:

Figure 6⁶

In fact, “the two mental contents posited by Brentano are basically the same as the two posited by Rosenthal. However, instead of having them carried by different mental states, Brentano has them carried by one and the same state. This has the advantage of theorizing PSA as intrinsic to

⁵ “Permanent self-awareness in Brentano's model” (Kriegel 2002, 525).

⁶ “Figure 4. Introspective awareness in Brentano's model” (Kriegel 2002, 525).

the conscious state. A state involves PSA not in virtue of being suitably represented by another mental state, but *in virtue of its own representational profile*” (Kriegel 2002, 525; emphasis added).

This solution is also the very difficulty of the Brentanian model – the “mysteriousness” of the model. “What is mysterious about Brentanian experiences is specifically the fact that *they represent themselves*” (Kriegel 2002, 526; emphasis added). The riddle of Brentanian model that we need to solve is that of *self-representation*.⁷

3-2. Paradox: Self-Representation and Self-Membership

The problem of the Brentanian model lies the intuitive difficulty to understand the mechanisms underlying this capacity for self-representation. “What exactly is this capacity is supposed to amount to?” (Kriegel 2002, 526). *How* can two different mental contents be carried by one and the same mental state? In other words, one mental state is one, but at the same time not one. I restructure this problem in the framework of belongingness and mutuality. Namely, two different mental contents (seeing a thing and seeing oneself) belong together to one mental state. This unitary mental state represents a process itself as a whole, not two separate processes combined together.

More precisely, seeing oneself in this process means seeing oneself seeing a thing. Therefore, the two mental contents of seeing a thing and seeing oneself should be reformulated as “seeing oneself seeing a thing.” In this context, the problem seems to be focused upon “seeing oneself,” because the “oneself” that is seen includes not only the self but also the self’s act of seeing at the same time. This is the core problem of self-representation: *How can one represent oneself?* In other words, how can one be the observer and the observed at the same time? This observed self is the observer of a thing and itself at the same time. The core of this problem is the problem of *self-membership*. How can one be the container and the member at the same time?

I attempt to suggest a way to logically comprehend this structure of self-representation or *resolve* this paradox by applying knot-logic by Louis Kauffman and present a new model which is knot-

⁷ Knotted models applied to Brentano’s models are to be presented in a separate paper with a detailed explanation of the related knot logic.

shaped. This is a paradox, because two different mental contents are presented by one and the same state. They are different yet the same. This paradox can be *resolved* in a knotted model.

For example, here is a modified model of the Brentanian one with a twist which creates a knot link on it⁸.

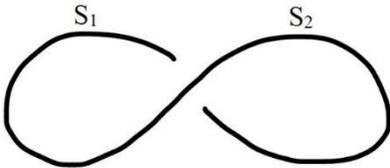


Figure 7

Or, one can present the same model as below as well:

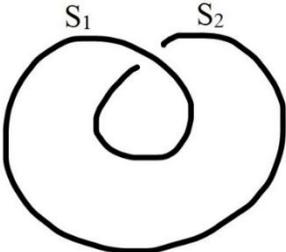
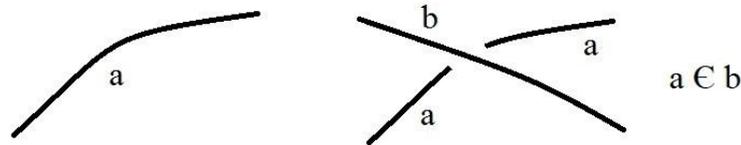


Figure 8

⁸ The knot link logic is to be also discussed in another paper along with the logic of belongingness.

The crucial point of this model lies in the loop. This is one seamless ring that is twisted once in the middle. This twist creates a crossing on the ring. At this crossing, this one ring becomes two.



The line that goes on the top and the line that goes on the bottom at the crossing are still the same ring. In other words, at each crossing a membership relationship is created. Membership is indicated by the diagram shown below (Kauffman 1995, 33).

Figure 9

Here, Kauffman shows that ‘a’ belongs⁹ to ‘b’ ($a \in b$). The arc ‘b’ is unbroken, while the arc ‘a’ is broken. “Following the pictorial convention of illustrating one arc passing behind another by putting a break in the arc that passes behind one, one says that *a passes under b*” (Kauffman 1995, 33). At the crossing, in both *Figure 7* and *8*, this membership relationship is created by a loop, but note that it is still one single ring. Therefore, in the above models, S_1 and S_2 *belong together*.

Let’s say one walks on this twisted ring. At the crossing, one who started walking on the S_1 side could *see* oneself on the other side S_2 which is either above or under where one stands. Here a transformation of the status of the one who walks on the ring happens: one goes from an observer to the observed, i.e. the container becoming the member.

What is significant about *Figure 7* and the *Figure 8* is that in these models, S_1 and S_2 are different and identical at the same time. In other words, the two different states S_1 and S_2 are wrapped up in and indicate a single mental act. Both figures, *Figure 7* and *8*, are a single ring but with a twist that creates a *self-mutual relationship* within itself.

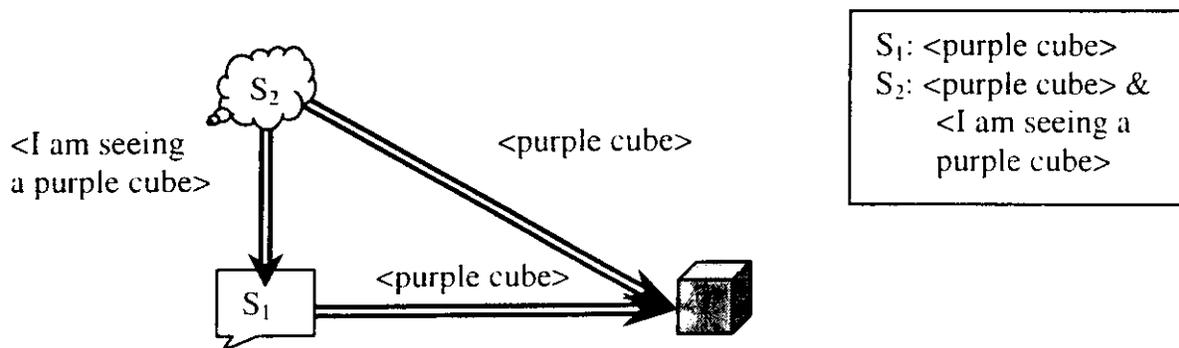
In this model, the first order state (seeing a purple cube) and the second order state (seeing myself seeing a purple cube) can appear to be conscious at the same time, i.e. belong together in

⁹ This notion of belongingness is used in the domain of the knot set theory (see Kauffman 1995).

the same (identical) consciousness, yet they are two different stages of a conscious act.¹⁰ This solution can explain the *belongingness* of the different layers of mental states that are temporally separated as in *Figure 3* and *Figure 4*.

4. One More Representational Attempt by Kriegel

Kriegel also presents a new model to overcome the difficulty of the Brentanian model. Namely, he attempts to find a model where a PSA-involving experience involves a conscious representation of the self without representing itself. He suggests a *three-step psychological process* model. “A *three-step psychological process* takes place in the subject. First, there is a non-conscious purely sensory reaction, S_1 which registers the presence of a purple cube. Second, the occurrence of S_1 brings about a second-order state, S_2 , which represents the occurrence of S_1 in the subject. Third, S_2 also comes to represent the purple cube itself. At this stage, then, S_2 represents both that there is a purple cube and that one is, oneself, seeing the purple cube, but without representing itself. S_2 is the PSA-involving conscious experience” (Kriegel 2002, 527). See the following figure.



¹⁰ Kauffman approaches Russell’s paradox from a different point of view with this logic of self-membership: Let R be the set that contains all the sets that do not include themselves. If R contains itself, R does not include itself, but if R does not include itself, R should be a member of itself. S_1 and S_2 are different yet the same. We can resolve this paradox in the domain by having every set as a member of itself and not a member of itself (Kim forthcoming, see also Kauffman 1995, 40), which is visually represented on the loop created by a twist on a ring. Russell’s paradox becomes meaningful in the knot set domain (Kauffman 1995, 39) in the framework of membership and belongingness discourse. This is valid in the discussion of knot set theory as a radical variant of a set theory. I elaborate this logic more specifically in “An Application of Kauffman’s Knot Logic to the Brentanian Model of Permanent Self-Awareness” (Kim).

Figure 10¹¹

Concerning the difference between PSA and introspective awareness, he suggests that “we can avail ourselves of the Brentanian notions of primary and secondary content. When the primary content of S_2 is the external cube, S_2 involves only PSA; when its primary content is the internal cube sensation, S_2 constitutes introspective awareness” (Kriegel 2002, 527).

In effect, the knotted model with one crossing resolves the paradox of self-representation by having two different mental states belonging to each other, i.e. a unitary mental process. However, this knotted model still suffers another shortcoming. Namely, it is only two-fold, which is again problematic, because only the self-mutuality of the observing and the observed self is represented by this model. Which means, this model is not based on the necessary relationship between the process of seeing oneself and the process of seeing a thing. In other words, one can be aware of oneself without seeing a thing at the same time. The two-fold knotted model is good enough for representing the relationship between the observing self and the observed self, but it is not enough for representing the observation of an external object (purple cube) *necessarily* included in the process of self-awareness. In other words, the two-fold models are good for representing self-awareness but not a PSA-involving conscious experience.

The whole point of the permanent self-awareness lies in that one is permanently aware of oneself when seeing an object that is not myself (or the othered self). The key point is that these models are supposed to show the necessary relationship between the process of seeing a thing and the process of seeing myself seeing it.

5. Trefoil Knot Model of Consciousness I

Kriegel’s model of a *three-step psychological process* could be a basis for a more advanced knotted model of a conscious experience. A simple self-membership created by a loop on a ring is applied to knot-models in order to help us comprehend the self-mutual and mutual

¹¹ “Figure 6. One more model of permanent self-awareness” (Kriegel 2002, 528).

membership relationship of knots. The trifold relationship between the states in Kriegel's *One more model of permanent self-awareness* could be represented in a trefoil knot model.

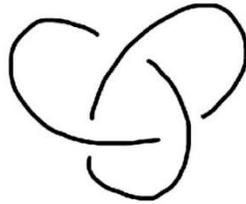
When I see a thing:

- (a) A thing is sensed (as a non-conscious sensory reaction).
- (b) I see the sensed thing (represented in my consciousness).
- (c) I see myself seeing a thing.

This is a three-fold process. Kriegel's three-step psychological process model (*figure 10*) is the representation of these three steps. And this is one process, i.e. one mental act. In other words – in the sense of knot logic – they *belong together* to one mental state. This model includes the moment of 'seeing a thing' in its process. The problem of this model, however, as with the previous models, is that this model does not present the self-mutual relationship between the self as the observer, the self as the observed, and the process between these two othered selves. The self-mutuality means that it is in fact one and the same self. As mentioned above, the two-fold knot models with one crossing in the middle show the relationship between the observing and the observed self, but not the process¹² nor the othered self while seeing an object. The defect of the earlier presented knotted models with one loop was that they had only two differentiated sides in one complete structure. We need three. This is where we can think of a trefoil knot.

A trefoil knot is the simplest example of a nontrivial knot, which means that it is not possible to untie this knot in three dimensions without cutting it. It is *one and the same ring*. As the name of the knot indicates, this knot has three differentiated sides. Compare it to the above-presented knots with one twist with two differentiated sides (see *figure 7, 8*). These three steps do not happen one by one after one another in a temporal sequence, but rather happen all at once when I see a thing. Therefore, this can represent the complete inner-structure of the conscious act of seeing a thing. When I see a thing, it's not only a thing that I see, but it's a thing and myself at the same time that I see. Here, one twist wouldn't do anymore, we need more than one crossing to include all three steps in one process. The three-step psychological process could fit the trifold structure of a trefoil knot, because these three different steps have to belong together, and the model needs to be able to show the self-mutuality of the different steps.

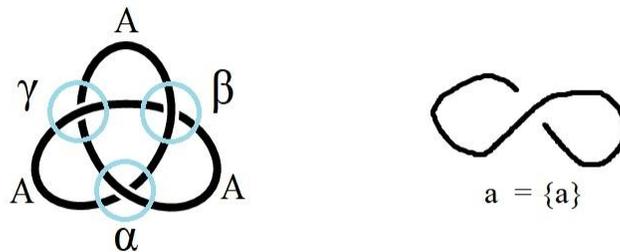
¹² The act of seeing an object



So, here is a trefoil knot:

Figure 11

There are three crossings in this knot where membership relationship is represented. In the case of a trefoil knot, the membership relationship at each crossing indicates a self-mutual relationship as in the previous knot models (Figure 7, 8), because a trefoil is a single seamless ring (A). I marked the three crossings on a trefoil knot, and they appear in the diagram below



(Kim forthcoming):

Figure 12

“This shows the self-mutuality, because a trefoil knot consists of one seamless ring. Therefore, a trefoil knot represents a stable self-mutuality in three loops about itself: $a = \{a\}$ ” (Kim forthcoming). The self-mutual relationship at each crossing are as appears in the following table (Kim forthcoming):

Crossing	Belongingness	
A	$A \in A$	$A = \{A\}$
B	$A \in A$	$A = \{A\}$
Γ	$A \in A$	$A = \{A\}$

The relationship of the three processes between S_1 and S_2 is self-mutual in the sense that they form a single mental act – perception of a purple cube. All three steps belong to one process in a trefoil knot. Therefore, the model (*Figure 10*) could be modified with a trefoil knot as below:

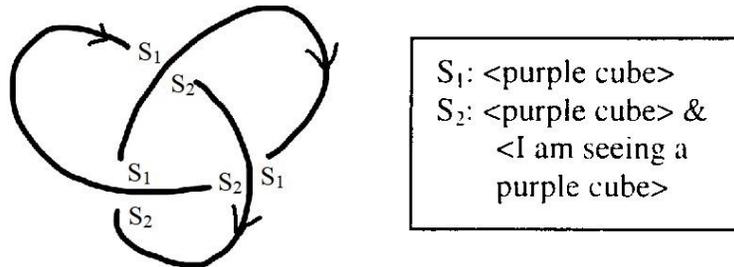


Figure 13

When applied to the three-step process (a), (b), and (c), each step should be marked on the trefoil knot as below, the (c) as the trefoil knot itself as a whole.

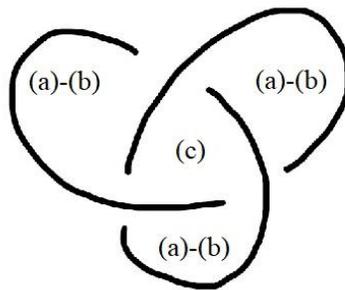


Figure 14

6. Trefoil Knot Model of Consciousness II

However, I still have some problems with the three-step psychological process model.

1) The first step of the three-step psychological process as a purely sensory reaction is not conscious yet, therefore, it is questionable if this stage could be included in this consciousness model.

2) Without the first step as a purely sensory reaction, this model does not differentiate itself much from the Brentanian model. This means that a one loop knot model would still do for this three-step process model.

3) Therefore, this model does not seem to overcome the shortcoming of the previous models, which do not show the structure and the necessary relationship of the observing and the observed self.

Instead, I suggest another three-step process:

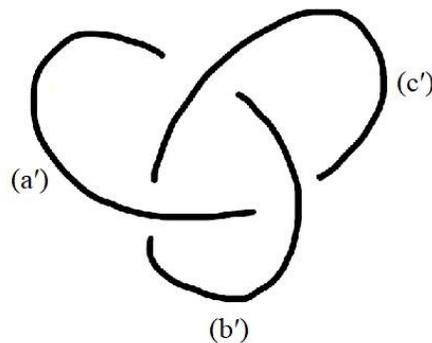
(a') I see a thing.

(b') I see(know) that I see a thing.

(c') I see(know) that I see(know) that I see a thing.

First, I remove the first step of a purely sensory reaction. Then I add another step (c') which indicates the cognition of the whole process. This process seems to be holding the key to comprehension of the knotted model of consciousness, which would tell us something that has not yet been discussed about consciousness. This stage represents the original unity, i.e. identity of the differentiated¹³ states of self, as well as the unity of the different stages of the process.

When these three steps are applied to a trefoil model, one could mark the different stages as



below:

Figure 15

¹³ The differentiation refers not only to the differentiation of the observing self from the observed self, but also the differentiation of the self from the not-self, i.e. the observed external object.

This three-step process seems to fit the trefoil model better than the previous one, because each stage (a'), (b'), and (c') constitute a trifold structure as a whole process, with each arc of the trefoil representing each stage. All three steps belong to one and the same process – a trefoil knot.

Technically, in the previous three-step process, (a) could not belong to a consciousness model because it is not conscious, unless it is attached to the (b) step. The (a) and the (b) step could represent one arc of the trefoil knot together. Then the relationship is not quite trifold, because it is ((a)-(b))-(c), rather than (a)-(b)-(c). This two-fold relationship can be illustrated in the one link knot model.

One might still ask whether the stage (c') is not superfluous. No, it is not. This step (c') is what brings about the trifold structure. This step is the binder¹⁴ of the other two steps (a') and (b') and represents the understanding of the whole process as a whole. The three steps on each arc of a trefoil knot are the different states of one act, but note that this is one and the same act, as a trefoil knot is one seamless ring.

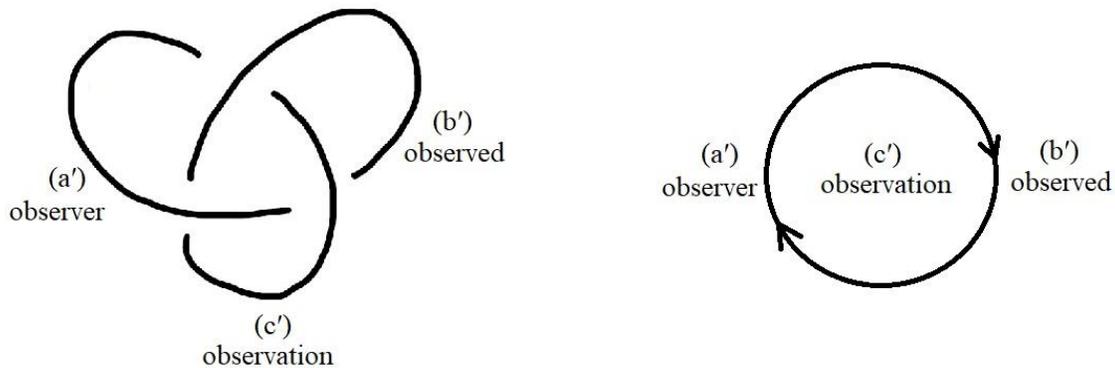


Figure 16

¹⁴ As the ultimate glue! *Der Ursprung der Einheit des Prozesses.*

When I see that I see a thing, the I who is observed by the first I is the observer of the thing that is observed. The point where these two states, “I see myself” and “I see a thing” is bound and therefore becomes one process, is the second I, who is observed by the first I and observing an object at the same time. The (c') manifests the moment of *seeing* this process. Therefore, (c') represents the act of observation itself.

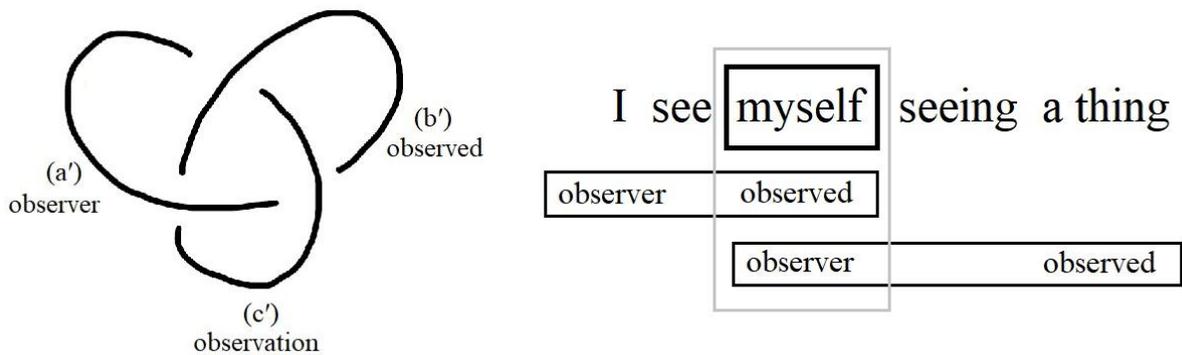


Figure 17

In fact, this trifold structure manifests the inner structure of self. Let me reformulate the three-step process as following: let's say that I is the observing self, I' is the observed self, and O is a thing (object). The arrow (\rightarrow) represents the act of seeing.

$$\begin{aligned}
 & I \rightarrow O \\
 & I \rightarrow (I \rightarrow O) \\
 & (I \rightarrow O) = I' \\
 & I \rightarrow (I \rightarrow (I \rightarrow O))
 \end{aligned}$$

$$I \rightarrow (I \rightarrow I')$$

$$(I \rightarrow I') = I'$$

□

$$I \rightarrow I'$$

Here we can see that the discussion of the permanent self-awareness and consciousness boils down to the structure and the relationship between the observing and the observed self. This is, however, still a trifold structure between the observing self, the observed self, and the observation. In the observation process, the observer and the observed are constantly switching back and forth.

I already have shown this in another paper (Kim *forthcoming*):

“The act of seeing – I (o) see my (present) self (s) – is the basis of the formation of ‘self-ness.’ In other words, I have to be able to see that I am there as I, for me to be able to perceive myself as I. The I that is observed is I but at the same time not the I, the observer. The *subjective* understanding of (my)self is based on the distinction of I and not-I and its identity. We can solve the paradox of $I = -I$ with the knot logic of self-mutuality: not-I as *knot-I*.”

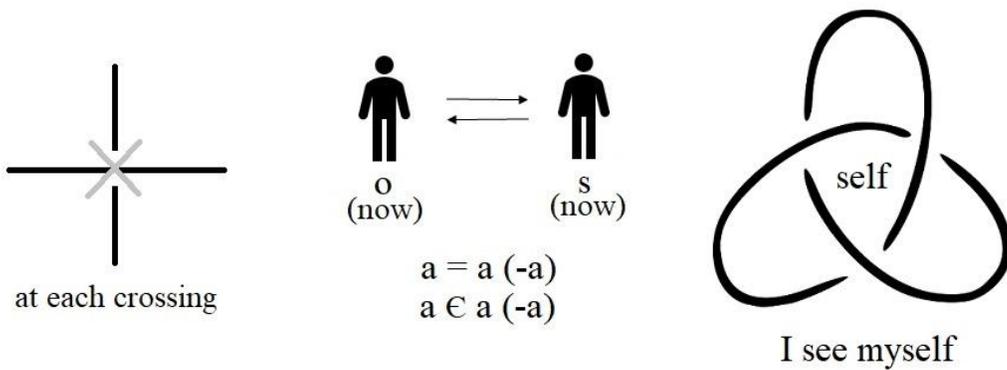


Figure 18¹⁵

¹⁵ Figure 27 (Kim *forthcoming*)

This feature – the inner structure of self – was not captured in the previous PSA models, which enables (justifies) the self-representational process of PSA in a trifold structure. The trefoil knot model not only represents its trifold structure, but also reveals¹⁶ the structure of self within itself.

7. Conclusion

The logic of mutuality and self-mutuality in the trefoil knot enables the visualization of the fundamental inter-relations of a subject's conscious experience of self and others and their structure. This explains how we can be aware of myself and others at the same time. Conscious experience is possible through an interaction of the perception of self and the perception of not-self (including other objects and observed self). This double perception occurs simultaneously.

*Reference

Kim, Hye Young. *Forthcoming*. "A Topological Analysis of Space-Time-Consciousness: Self, Self-Self, Self-Other." *When Form Becomes Substance. Power of Gesture, Grammatical Intuition and Phenomenology of Space*, Basel: Birkhäuser-Springer.

Kim, Hye Young. An Application of Kauffman's Knot Logic to the Brentanian Model of Permanent Self-Awareness (unpublished).

Kauffman, L. (1995) Knot Logic. in Kauffman, L (ed.) *Knots and Applications. Series on Knots and Everything Vol. 6*. Singapore: World Scientific.

Kriegel, U. (2002) Consciousness, Permanent Self-Awareness, and Higher-Order Monitoring. *Dialogue*. XLI. pp. 517-40.

¹⁶ By "reveal" I mean, "makes visible, therefore, comprehensible."