A mereological defense of type-identity physicalism from Kripke's modal objection[*]

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[. . .] in a particular substance there is nothing substantial except the particular form, the particular matter, or the composite of the two. [. . .] And, therefore, every essence and quiddity and whatever belongs to substance, if it is really outside the soul, is just matter, form, or the composite of these or, following the doctrine of the Peripatetics, a seperated and immaterial substance.

– William of Ockham, *Summa Logicae* [34], *p. 97.*

The *mind-body* problem is ordinarily (and broadly) construed as the problem of characterising a precise relation between mental events, states and processes (*qua* sensations, actions and convictions) and the physical ontology (typically, the appropriate neurological constituents) corresponding thereto. *Physicalism,* therefore, offers a solution to the problem by attempting to establish this relation as distinctly material, or *physical*.

Seager [30] summarily characterises the doctrine of physicalism by employing the notion of *ontological dependence:* "φ ontologically depends on ψ just in case ψ provides the metaphysical ground for φ" (*p.* 146). Physicalism, therefore, can be recast '[. . .] simply as the claim that everything ontologically depends on the physical' (*Ibid.*). Continuing in this vein, *type-identity physicalism*[1] (**TI**) can be construed as the thesis that 'every property is identical to some narrowly physical property' (Rabin [29], *p.* 42), whereby *narrowly physical* properties '[. . .] are the properties studied in the physical sciences: charge, mass, being a lepton, having such-and-such spin, having such-and-such velocity xyz direction, *etc.*'; that is, we further restrict the physicalist thesis to assert that all *mental* properties *ontologically depend* on the associated *narrowly physical* properties.

The canonical applied example of **TI** is due to Kripke[2], and can be formalised as the following proposition:

[*] *Alt.*: **Critically assess Kripke's argument against type-identity physicalist theories.**

[1] In contrast to the more ontologically parsimonious *token*-identity physicalism, characterised by McGinn [24]: "Every mental event is identical with some physical event, though the properties in virtue of which an event is mental are not themselves physical properties" (*p.* 29).

[2] *cf.* Kripke [16], *p.* 25.

(**P**) Pain is *strictly identical*[3] to *c*-fiber stimulation[4].

It shall prove useful to note that the **TI**-theorist's conviction in the above proposition **P** commits him to a two-fold symmetric responsibility: firstly, that there could exist no instance of pain without *c*-fiber stimulation; and secondly, that there could exist no *c*-fiber stimulation which is not an instance of pain.

Kripke's seminal work *Naming and Necessity*[5] served as a catalyst for the metaphysical epoch whereby identity would come to be known as a relationship of *non-contingency* – or, in the language of modality, *necessity* – in contrast with a relationship of contingency. Kripke's counterfactual[6] terminology can be elucidated using the example put forth by Simmons **[32]** (*p.* 81): for Kripke, the descriptor 'Aristotle' is a *rigid designator*[7], identifying precisely the same individual in all possible worlds[8], whereas the descriptor 'the teacher of Alexander', as we can certainly *conceive* such a position to be held by any number of distinct individuals, fails to identify *only* that individual we understand to be Aristotle.[9] Thus, as explicated by Levine [20], the first central claim of the 'modal argument' is 'that all identity statements using rigid designators on both sides of the identity sign are, if true at all, true in all possible worlds where the terms refer' (*p.* 354).

Kripke extends his analysis of proper names to attack the former conviction of the aforestated two-fold responsibility. In *Identity and Necessity*[10] Kripke notes an 'illusion of contingency'[11] common to both the proposition **P** and the below proposition **H**:

[3]The phrase 'strictly identical' is taken to be a Leibnizian proposition, understood in the usual sense; all **TI**-propositions of the form $\varphi = \psi$ (where we can substitute $\varphi \equiv$'pain' and $\psi \equiv$'c-fiber stimulation') satisfy Leibniz' ontological principles (detailed originally in Leibniz [17]), in addition to the standard logical conditions for equivalence. That is:

$$\begin{aligned}
\forall\varphi\forall\psi\{\varphi R\psi \implies \forall P[P(\varphi) \iff P(\psi)]\} &\quad \text{(Indiscernibility of Identicals)}\\
\forall\varphi\forall\psi\{\forall P[P(\varphi) \iff P(\psi)] \implies \varphi R\psi\} &\quad \text{(Identity of Indiscernibles)}\\
\forall\varphi(\varphi R\varphi) &\quad \text{(Reflexivity)}\\
\forall\varphi\forall\psi(\varphi R\psi \implies \psi R\varphi) &\quad \text{(Symmetry)}\\
\forall\varphi\forall\psi\forall\phi[(\varphi R\psi \wedge \psi R\phi) \implies \varphi R\phi] &\quad \text{(Transitivity)}
\end{aligned}$$

[4]The important function of the phrase '*c*-fiber stimulation' is to serve as a placeholder for whatever narrowly physical type corresponds to the occurence of pain in actuality; the *a posteriori* neurological specifics are, for the purposes of the argument at hand, trivial.

[5]*cf.* Kripke [15].

[6]Kripke's argument is naturally rooted in Lewisian possible-worlds counterfactual semantics; *cf.* Lewis [21, 22, 23].

[7]

> 'Let's call something a *rigid designator* if in every possible world it designates the same object, a *nonrigid* or *accidental designator* if that is not the case' (Kripke [15], *p.* 48).

[8]Such rigidity is trivially ensured by the property of Leibnizian identity: if φ is anything at all, it is equal to itself; *'everything is what it is and not another thing'* (Kripke [16], *p.* 23).

[9]In the language of contingency, it can equivalently be said that *being the teacher of Alexander* is a *contingent* property of *being Aristotle;* that is, there is a possible world in which Aristotle is not the teacher of Alexander but, as Simmons suggests, 'a soldier' (Simmons [32], *p.* 81).

[10]*cf.* Kripke [16].

[11]

> '[. . .] "Heat is the motion of molecules" will be necessary, not contingent, and one only has the *illusion* of contingency in the way one could have the illusion of contingency in thinking that this

(**H**) Heat is strictly identical to molecular motion.

The ostensible contingency of the proposition **H** is illusory precisely due to Kripke's observation that, whilst it might *seem* that one can conceive of heat without molecular motion, one's conception is in fact a conflation of heat *simpliciter* with the *sensation* of heat, a property only contingently associated with molecular motion.[12] The distinction between heat *simpliciter* and the sensation thereof is one that cannot be applied to *pain,* precisely because pain *simpliciter* and the sensation by virtue of which the referent *'pain'* is fixed are indiscernible and identical:

> 'To be in the same epistemic situation that would obtain if one had a pain *is* to have a pain; to be in the same epistemic situation that would obtain in the absence of pain *is* not to have a pain. The apparent contingency of the connection between the mental state and the corresponding brain state thus cannot be explained by some qualitative analogue as in the case of heat' (Kripke [15], *p.* 152).

In absence of any successful endeavour to account for the illusion of contingency in this latter instance, Kripke concludes that the proposition **P** must be, in actuality, contingent. His conclusion provides the justification for the initial premiss of his *modal argument,* which I formalise as follows:[13]

P1	We can conceive of the instantiation of pain without the instantiation of c-fiber stimulation.	
P2	Whatever is conceivable is metaphysically possible.	
P3	The instantiation of pain without the instantiation of c-fiber stimulation is metaphysically possible.	(P1, P2)
P4	If it is possible that φ may be present without the presence of ψ, then φ and ψ are not strictly identical.	
C	Pain is not strictly identical to c-fiber stimulation.	(P3, P4)

table might have been made of ice. We might think one could imagine it, but if we try, we can see on reflection that what we are really imagining is just there being another lectern in this very position here which was in fact made of ice' (*Ibid.*, *p.* 23).

[12]The revised proposition **H**, making explicit the aforementioned 'hidden' distinction as the antecedent of illusory contingency, may take the following form:

> (**H**) The narrowly physical phenomenon which causes the sensation of warmth, *etc.,* is strictly identical to molecular motion.

[13]I present an adapted form of the argument presented by Alward [1], *p.* 16.
Concerning the symbolic formalisation: let $\Delta\varphi$ denote the *conceivability* of the proposition φ; let $P_c(\varphi)$ denote φ's being the property of *physical* pain (the stimulation of c-fibers); let $P_{\neg c}(\varphi)$ denote φ's being the property of *otherwise phenomenal* pain (*not* the stimulation of c-fibers); and let $O(\varphi, \psi)$ denote φ's *observing* (or *experiencing*) the property ψ.
Premise P2 concerns the positive Humean relationship between *conceivability* and *possibility*, one that has attracted considerable attention. Due to the scope of this paper, I shall here concede Kripke's premiss. Chalmers **[4, 5]** and Yablo [36] give accounts of *'imaginability'* or *'conceivability'* and argue in favour of the sufficiency of the relationship; Winstanley **[35]** presents a critical examination.

$$\dfrac{\exists\varphi\forall\psi\Box[(P_c(\psi)\wedge O(\varphi,\psi))\implies\neg P_{\neg c}(\psi)] \qquad \dfrac{\Delta[P_{\neg c}(\varphi)] \qquad \forall\varphi[\Delta(\varphi)\implies\Diamond\varphi]}{\Diamond P_{\neg c}(\varphi)}}{\exists\varphi\forall\psi\Box[\neg P_c(\psi)\wedge O(\varphi,\psi)]}$$

In accepting the validity of Kripke's argument assuming the veracity of the premisses, the physicalist must resort, as I understand the situation, to one of three paths of recourse: the tenability of reductive physicalism could be flatly repudiated; the illusion of contingency could be dismissed as an epistemic irrelevance[14]; or, as shall be the forefront aim of this paper, an account of the illusory **P**-contingency could be sought, in a manner analogous to Kripke's account of the felt **H**-contingency.

In order to account for the 'illusion of contingency' as detailed thus, it shall be necessary to characterise the ontological structure of *events* – this characterisation shall take the particular form of an essentially Davidsonian[15], *four-dimensionalist*[16] interpretation, conducive to the broader thesis of physicalism. To construe the event in this fashion is not wholly uncontroversial[17], but should not, I claim, be viewed as a radical interpretation; one may consider the event dissimilar to the concrete *particular* only insofar as the event is comprised of particulars at each instant, and is thus, considered holistically, an aggregate (as intuitively understood) of particulars.[18]

[14] A comparable sentiment in found in Skokowski's [33] effort to similarly *'explain away'* the illusion of contingency. Nagel's [25] seminal work may also suggest an inherent intractability in the purely phenomenal quality of *pain simpliciter;* Hill [12] employs the Nagelian distinction between *perceptual* and *sympathetic imagination* to contest that our intuition about 'conceiving' of pain naturally engenders equivocation about the term.

[15] *cf.* Davidson [10, 11].
Kim (*cf.* Kim [13], *pp.* 74–77 and Kim [14], *pp.* 22–29) discusses *functionalism* as a redemption of type-identity physicalism; incidentally, the Kimian conception of events is directly comparable to the local treatment. It is appreciated that an event-based temporal consideration of Kripkean antiphysicalism is comparable to Kimian functionalism.

[16] A thorough defense of four-dimensionalism can be found in Sider [31].

> *'The notion of the present time that is so crucial to presentism is meaningless within Minkowski spacetime, in which there is no distinguished partition of spacetime into space and time, and no observer-independent notion of simultaneity'* (*Ibid.*, *p. 42*).

Further, Putnam [27] offers supporting observations. It is worthwhile to note that this doctrine is unlikely to carry the least metaphysical baggage of all doctrines that should satisfy a mereological analysis; nonetheless, the background ontology is assumed.
It is unclear, on the Davidsonian view, whether the event is precisely the *endurance* of the three-dimensional *through* time (or at some temporal *instance*), or the *eo ipso* four-dimensional. But this 'distinction' is, it seems, moreso a semantic discrepancy than a divergence of metaphysical perspectives. If the object, conventionally (or, rather, intuitively) three-dimensional, endures for some length of time, the *totality* of the endurance constitutes the event; at any irreducible instance, even, the object is ensnared in four-dimensionality. However one may perceive the object, to concede even a weakly-Quinean ontology of the event is to make uncontroversial one basal claim; the event, much like the particular, is concrete. So much so, in fact, that to draw a distinction between the event and the particular is, I submit, superfluous.

[17] Subtle deviations from a purely reistic conception of events can be found, for instance, in Chisholm [6, 7]. The relative ontological parsimony of taking events to be spatio-temporal regions, however, does not, i claim, ostensibly incite any insurmountable criticism nor preclude the applicability of efficacious mereological examination.

[18] This reading of the event is, much like many ontological considerations, inextricable from Quinean theory. In a passage from which Pianesi and Varzi (*cf.* [26], *p.* 9) note as exemplary of the materialistic 'extreme'

Mereology, as originally conceived by Leśniewski[19] is in essence a theory of *parts* and *wholes;* on the mereological view, an aggregate of material objects (*concreta*) is itself nothing more than a concrete *whole* constituted by those *parts* taken as a plurality. Although without explicit reference, Cantor succinctly characterises the core tenet of the system in *Mitteilungen zur Lehre vom Transfiniten*:

> 'Any set of distinct things can be regarded as a single thing in which those objects are constituents or constitutive elements' (Cantor [3], *p.* 83).

Pace Leśniewski, the binary *parthood* relation (as in the expression $\varphi \leq_p \psi$; intuitively, φ is a *part* of ψ) shall be taken as the sole primitive[20], by virtue of which we define the auxiliary relation of *proper* parthood:

Def. $\forall\varphi\forall\psi[\varphi <_p \psi \iff (\varphi \leq_p \psi \wedge \varphi \neq \psi)]$ *Proper Parthood*

Thus, for any events $e_1, \ldots, e_n \leq_p E$, we call the part e_i *proper* should it be the case that e_i is *spatio-temporally distinct* from the greater event E.

The applicability of mereology as detailed thus to the aforestated Kripkean criticisms demands a treatment of *mental* events as a distinct subset of all conceivable events[21]. One such effort to demarcate the properties that distinguish the former from all remaining instances of the latter is due to Brentano, who introduced the notion of *intentionality* as a preferential criterion for the mental. Contrasted with *'purely physical'* states[22], the *mental* state is intentional inasmuch as it is *directed at something* or that it is representative of something as being a certain way:

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of event philosophy, Quine unambiguously renders the event as the totality of what it occupies at a certain spatio-temporal region:

> 'Physical objects [...] are not to be distinguished from events. [...] Each comprises simply the content, however heterogeneous, of some portion of space-time, however disconnected or gerrymandered' ([28], *p. 171*).

[19] *cf.* Leśniewski [18, 19].

[20] The background axiomatic system shall be assumed to be Leśniewski's atomistic mereology, constructed upon a sole axiom (*cf.* Clay [9]) and characterised as constituting a *'third layer'* of his broader system of logic (*incl.* his *'ontology'* and *'protothetic'*). It is emphasised that, analagous to the manner in which *ontology* presupposes *protothetic*, *mereology* presupposes both the former and latter of these systems. Thus, we understand mereology precisely as detailed by Clay:

> 'Mereology, it may be recalled, is Leśniewski's system consisting of:
>
> (1) A system of propositional logic, upon which is based
>
> (2) A system for characterizing the meaning of 'is', upon which is based
>
> (3) A system for characterizing the relation of 'part' to the 'whole" (Clay [8], *p. 467*).

[21] It is trivially true, I claim, that not all events are mental events.

[22] In defending a reductionalist physicalist thesis I am, of course, committed to the notion that *all* events are physical – the phrase 'purely physical', therefore, suggests not that mental events are under any interpretation non-physical (*contra* Brentano; 'intentional in-existence is characteristic exclusively of mental phenomena. No physical phenomenon exhibits anything like it' (Brentano [2], *p.* 89)), but rather refers only to those events characterised under the Brentanian theory as disjoint from the mental.

> 'Every mental phenomenon is characterized by what the Scholastics of the Middle Ages called the intentional (or mental) inexistence of an object, and what we might call, though not wholly unambiguously, reference to a content, direction towards an object [...], or immanent objectivity. In presentation something is presented, in judgement something is affirmed or denied, in love loved, in hate hated, in desire desired, and so on' (Brentano [2], *p.* 88).

Accordingly, intentionality might be taken idiomatically as the *'mark of the mental'*; the intentional idiom, therefore, may be characterised formally by introducing a primitive 'observation relation' ($O(\varphi, \psi)$, read as φ *observes* ψ). The function of the dyadic relation of observation might be demonstrated expositorily: when one observes an external event, a subsequent chain of events is actuated whereby the resultant event is one of intentionality (in Brentanian terms, *directed towards* the initial event). Thus, concerning the relation $O(\varphi, \psi)$, φ is the *observing* event and ψ is the *observed* event; further, the relation itself establishes an event $E[O(\varphi, \psi)]$ within which the relata φ, ψ are subsumed, *i.e.,* contained as proper parts. For which all events are universally bound, therefore, we observe the following axiomatic sufficiency:[23]

$$(\alpha) \quad \forall\varphi\forall\psi\big(O(\varphi,\psi) \implies \{\varphi \leq_p E[O(\varphi,\psi)] \wedge \psi \leq_p E[O(\varphi,\psi)]\}\big)$$

The subset of events that possess the 'mark of the mental' can further be restricted to precisely those events that are *reflexive* or *phenomenal, i.e.,* observations of themselves; in the case of reflexive events *qua sensations,* I submit that it is only when one *observes* one's sensations (*i.e,* pain) that they are rendered phenomenal. Formally:

$$(\beta) \quad \forall\varphi\forall\psi\big([O(\varphi,\psi) \wedge \varphi = \psi] \implies \{\varphi = E[O(\varphi,\psi)] \wedge \psi = E[O(\varphi,\psi)]\}\big)$$

To observe the intentionally reflexive nature of phenomenal events strikes at the foundation of the Kripkean problem, *viz.* the ostensible insurmountability of establishing a parallel between the felt contingency of *heat* and of *pain.* Incidentally, conceptual motivation for the observation can be found in Kripke himself:

> '[...] the identity theorist does not hold that the physical state merely *produces* the mental state, rather he wishes the two to be identical and thus *a fortiori* necessarily co-occurrent. In the case of molecular motion and heat there is something, namely, the sensation of heat, which is an intermediary between the external phenomenon and the observer. In the mental-physical case no such intermediary is possible, since here the physical phenomenon is supposed to be identical with the internal phenomenon itself' (Kripke [15], *pp.* 151–152).

The mereological conception of events as constructed thus far can provide an account of Kripke's illusion of contingency, principally through establishing an analogue between the exonerated proposition **H** and the problematic proposition **P**. The proposition **H** can be recast through substituting $h \equiv$'the observing of heat' an $m \equiv$'the observing of molecular motion':

[23] Should the parthood relation be strictly non-proper, we obtain the sufficiency:

$$(\alpha') \quad \forall\varphi\forall\psi\big([O(\varphi,\psi) \wedge \varphi \neq \psi] \implies \{\varphi \neq E[O(\varphi,\psi)] \wedge \psi \neq E[O(\varphi,\psi)]\}\big)$$

($\mathbf{H}'$) The φ *such that* $O(h, \varphi)$ is strictly identical to the ψ *such that* $O(m, \psi)$.

In contrast with the *necessarily* true unrevised proposition, the above proposition $\mathbf{H}'$ is contingently true, as the proposition is concerned solely with *non-rigid* designators. For any observings h, m, it is contingent whether there exists a strict identity between the covariables φ, ψ of the observation relation; we can certainly *conceive* one's observational faculties to be faulty, and thus, under the modal principle, there exists a possible world in which this is indeed the case ($\Diamond\exists\varphi\exists\psi[O(h, \varphi) \wedge O(m, \psi) \wedge \varphi \neq \psi]$). This is precisely analogous to Kripke's exoneration of the illusory contingency of $\mathbf{H}$ *via* fixed references.

One can extend this manner of producing corresponding contingent propositions to the problematic proposition $\mathbf{P}$. Consider the following revision, where $p \equiv$*the observing of pain* an $c \equiv$*the observing of c-fiber stimulation*:

($\mathbf{P}'$) The φ *such that* $O(p, \varphi)$ is strictly identical to the ψ *such that* $O(c, \psi)$.

Kripke's objection that pain is conceptually equivalent to the phenomenal quality of *the reference-fixing description of* pain can be recapitulated, in accordance with the principle (β), that pain is conceptually equivalent to the *observing* (or indeed, the observation in totality) of pain. Thus, to render to the proposition contingent, there must exist a condition of inequality to express the reality that the event observed by token c-fiber stimulation observings need not be c-fiber stimulation observings at all:

($\mathbf{P}''$) The φ *such that* $[O(p, \varphi) \wedge p = \varphi]$ is strictly identical to the ψ *such that* $[O(c, \psi) \wedge c \neq \psi]$.

Thus, I claim the necessary truth of the proposition $\mathbf{P}$ to be vindicated, *via* a strictly physicalist account of phenomenal experience, as any illusion of contingency may be explained as a conflation with the above, contingently true proposition $\mathbf{P}''$.

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