

NONTRIVIAL EXISTENCE IN TRANSPARENT INTENSIONAL LOGIC

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ABSTRACT

The paper analyses the validity of arguments supporting the assumption of a constant universe of individuals over all possible worlds within Transparent Intensional Logic. These arguments, proposed by Tichý, enjoy widespread acceptance among researchers working within the system. However, upon closer examination, this paper demonstrates several weaknesses in the argumentation, suggesting that there is an open possibility to incorporate a variable universe of individuals even in models within this system.

Keywords: individual; existence; non-trivial property; existence test.

1. Introduction

The constant universe of individuals of discourse is a fundamental concept within Transparent Intensional logic (TIL).¹ From the perspective of those well-versed in TIL, assigning existence to an individual holds little to no value, as every individual possesses it in a trivial manner. This foundational assumption governs the manner in which certain data is explained within the framework of TIL. Notably, existence, when considered as a value with *informative* content, is not ascribed to individuals but rather to what is known as ‘offices’ (positions that, at most, one can occupy at a given moment, such as the president of the USA) or to properties. An office is said to exist, for instance, when there is currently an occupant in that position—e.g., the president of the USA exists.²

There is a shared stance in TIL that when we ascribe existence to an individual, we claim something trivial, as it is presumed to be a property an individual cannot lack. However, ascribing existence to an office or a property can instantiate a non-trivial claim. When we ascribe existence to the office (e.g., ‘The current president of the USA exists.’), we claim that there is currently an individual occupying that office. This claim should not be confused with *another* claim stating that the office itself exists (e.g., ‘The office of the president of the USA exists.’). Offices can be vacant, but that does not mean they are non-existent. A vacant office does not venture into obscurity or ‘non-existence’. The widely discussed examples of ‘the king of France’ or ‘the first female president of the USA’ are completely graspable offices belonging to the ramified hierarchy of objects over the standard base in TIL.³ This line of inquiry then extends into areas of intensional logic or philosophy of fiction.⁴

The assumption of triviality of existence, when considered as a property of individuals, is not merely a baseless postulation within TIL. Instead, it forms a pivotal point in argumentation consistently endorsed by TIL

¹ The reader interested in TIL should consult e.g., Tichý (1988), Duží, Jespersen, and Materna (2010), and Raclavský (2020).

² This needs some clarification. The offices do exist even if they are vacant. This statement is considered trivial and non-informative, however. These functions are members of the ontology of the universe of objects defined within TIL. For example, the office ‘the first female president of the USA’ does exist. Technically, according to TIL, it is a function from possible worlds into chronologies of individuals, which does not have a value (i.e., the occupant) in the present world and time. So, even if an office is currently vacant, it does not lose its existence—it is a function we can still talk about. This statement should not be confused with the statement about there being an occupant of the office. This is a non-trivial statement that can differ in its truth value over time.

³ This, of course, depends on some presuppositions being satisfied (e.g., USA, France being somehow part of the ramified hierarchy too). That is usually handled by the correct selection of the base of the ramified hierarchy.

⁴ For discussions about intensional logics, see e.g., Jespersen (2015) and Duží (2017), for philosophy of fiction, consult Glavaničová (2018) and Duží, Jespersen, and Glavaničová (2021).

proponents. It is not just an assumption; rather, it is a defended one, supported by a line of reasoning. The core objective of this paper is to meticulously analyse these arguments and expose their shortcomings. It may well be the case that modelling existence as a property of offices, properties, and concepts is more fruitful. However, Tichý's line of argumentation was aimed at supporting the idea that existence, when used as a property of individuals, is only trivial. My argumentation in this paper directly addresses this point.

Tichý argued from a logical perspective rather than a pragmatic or methodological one. Therefore, even if the choice to model existence non-trivially as a property of offices, properties and concepts seems more promising, that is not the line of Tichý's argumentation. He appears to posit that stances assuming existence as a non-trivial individual property are based on conceptual confusion, and my argumentation challenges this view.

The paper is structured as follows: The second section provides a standard presentation of TIL with its foundational definitions. The third section outlines TIL's position within the debate about existence and non-existent objects. The fourth section presents the arguments for the constant universe of individuals over possible worlds, as stated in TIL. The fifth, core section of the paper, delves into an in-depth investigation of these arguments to highlight associated problems. The paper concludes with a discussion of relevance of the provided results.

2. TIL in brief

TIL is a system of explications designed to elucidate (natural) language phenomena, developed over a framework of abstract entities referred to as 'constructions' and their associated properties.⁵ This system equips us with the necessary tools to precisely distinguish the meanings of linguistic terms, particularly when they are considered within hyperintensional contexts. The objects used for explication within this system are defined

⁵ Usually, the term 'procedure' is deemed more general than the notion of construction, which, although also having non-formal interpretations, is the one originally defined within the formal definitions of TIL—there is a definition of *construction*, *constructing according to a valuation*, there are collection of *constructions of order n* within the ramified type hierarchy. I am aware of the use of the term procedure as well. Several of the primary TIL based texts published within the last decade or so contain the notion of construction and it is still used quite often. What is, perhaps, the most important thing, is that the formal definitions of the two terms are identical. The term construction is (or at least was) widely used, for example, in Duží, Jespersen, and Materna (2010), Duží and Jespersen (2015), Duží (2019), and Kosterec (2020). The term procedure is primarily used in, e.g., Jespersen (2019) and Jespersen and Duží (2022).

inductively and are rooted in a foundational level known as the ‘base’. While TIL allows for any finite set of disjoint non-empty sets to be considered as a base, it typically assumes a base consisting of sets of individuals, truth values, possible worlds, and real numbers, the latter being employed for modelling time and numbers. In TIL, individual properties are represented as characteristic functions defined on individuals.⁶ Individual offices are modelled as partial functions mapping worlds to time chronologies of individuals (if any), and propositions are represented as partial functions from possible worlds into the chronologies of truth values (if any). This foundational structure serves as a basis for expanding the system with constructions, which provide a model for hyperintensions. These constructions introduce new types of objects posited in interesting logical relationships with classical entities such as individuals and classical intensional entities, e.g., individual properties.

Before focusing on the model of existence, let’s present the relevant foundational definitions of TIL.⁷ Tichý’s canonical version of TIL presents the notion of valuation first:

Thus, where $R^1, R^2, R^3, R^4, \dots$ is an enumeration (without repetition) of all the types, a valuation is an array of the form

$$(v) \quad \begin{array}{l} X^1_1, X^1_2, X^1_3, X^1_4, \dots \\ X^2_1, X^2_2, X^2_3, X^2_4, \dots \\ X^3_1, X^3_2, X^3_3, X^3_4, \dots \\ X^4_1, X^4_2, X^4_3, X^4_4, \dots \\ \dots \end{array}$$

where $X^i_1, X^i_2, X^i_3, X^i_4, \dots$ is an R^i -sequence. (Tichý 1988, 61)

I agree this could appear alien to the standard notions of valuation known from classical logics. For TIL, valuations are infinite arrays of countably infinite sequences of objects. These arrays contain exactly one such sequence for each type. Consequently, variables are assigned an object with respect to such a valuation according to their position index and type index (this is usually not presented into technical details, but it is understood in TIL).

Let’s continue with the main notion within TIL:

⁶ Which is equivalent to modelling them as sets of individuals.

⁷ Those who are already familiar with the foundational definitions can safely skip this section.

Def. *construction*

- (i) Variables x, y, \dots are *constructions* that construct objects (elements of their respective ranges), dependent on a valuation v ; they v -construct.
- (ii) Where X is any object whatsoever (even a construction), 0X is the *construction Trivialization* that constructs X without any change.
- (iii) Let X, Y_1, \dots, Y_n be arbitrary constructions. Then *Composition* $[X Y_1 \dots Y_n]$ is the following *construction*. For any v , the Composition $[X Y_1 \dots Y_n]$ is v -improper if at least one of the constructions X, Y_1, \dots, Y_n is v -improper or if X does not v -construct a function that is defined at the n -tuple of objects v -constructed by Y_1, \dots, Y_n . If X does v -construct such a function, then $[X Y_1 \dots Y_n]$ v -constructs the value of this function at the n -tuple.
- (iv) $(\lambda\text{-})$ *Closure* $[\lambda x_1 \dots x_m Y]$ is the following *construction*. Let x_1, x_2, \dots, x_m be pairwise distinct variables and Y a construction. Then $[\lambda x_1 \dots x_m Y]$ v -constructs the function f that takes any members B_1, \dots, B_m of the respective ranges of the variables x_1, \dots, x_m into the object (if any) that is $v(B_1/x_1, \dots, B_m/x_m)$ -constructed by Y , where $v(B_1/x_1, \dots, B_m/x_m)$ is like v , except that it assigns B_1 to x_1, \dots, B_m to x_m .
- (v) Where X is any object whatsoever, 1X is the *construction Execution* that v -constructs what X v -constructs. Thus, if X is a v -improper construction or not a construction at all, 1X is v -improper.
- (vi) Where X is any object whatsoever, 2X is the *construction Double Execution*. If X is not itself a construction, or if X does not v -construct a construction, or if X v -constructs a v -improper construction, then 2X is v -improper. Otherwise, 2X v -constructs what is v -constructed by the construction v -constructed by X .
- (vii) Nothing is a *construction* unless it so follows from (i) through (vi).

Examples:

- ${}^0+$, ${}^0\text{Paul}$, $[{}^0+ {}^01 x]$ are constructions

The notion of a *construction* is a fundamental concept defined within TIL. The notion tends to be informally explicated using connotations with procedures. The most important aspect is that a construction is different from its results, and many different constructions can lead to the same result. This is grasped by construction's ability to construct an object (if any) with respect to a valuation.⁸

⁸ The iv) point of the definition of construction is where the construction Closure explicitly v -constructs a function. Closures always v -construct functions. However, Closures are not *the only* constructions that can v -construct a function. A variable can v -construct a function, a Trivialization can, etc. Therefore, there is no conceptual dependence of the point iii) on the point iv) of the definition.

The ontology of TIL, providing models for natural language phenomena, includes constructions as well as non-constructional objects. Constructions are defined with the assumption of other kinds of objects.⁹ One, therefore, needs to be careful to avoid potential vicious circles. TIL employs a type system for this matter. This type system is inductive and assumes there is a foundation: *base*. Here is the precise formulation:

Definition 2 (*ramified hierarchy of types*). Let B be a *base*, where a *base* is a collection of pair-wise disjoint, non-empty sets. Then:

T_1 (*types of order 1*)

- i) Every member of B is an elementary *type of order 1 over B*.
- ii) Let $\alpha, \beta_1, \dots, \beta_m$ ($m > 0$) be types of order 1 over B . Then the collection $(\alpha \beta_1 \dots \beta_m)$ of all m -ary partial mappings from β_1, \dots, β_m into α is a *functional type of order 1 over B*.
- iii) Nothing is a *type of order 1 over B* unless it so follows from (i) and (ii).

C_n (*constructions of order n*)

- i) Let x be a variable ranging over a type of order n . Then x is a *construction of order n over B*.
- ii) Let X be a member of a type of order n . Then ${}^0X, {}^1X, {}^2X$ are *constructions of order n over B*.
- iii) Let X, X_1, \dots, X_m ($m > 0$) be constructions of order n over B . Then $[X X_1 \dots X_m]$ is a *construction of order n over B*.
- iv) Let x_1, \dots, x_m, X ($m > 0$) be constructions of order n over B . Then $[\lambda x_1 \dots x_m X]$ is a *construction of order n over B*.
- v) Nothing is a *construction of order n over B* unless it so follows from C_n (i)-(iv).

T_{n+1} (*types of order n + 1*)

Let $*_n$ be the collection of all constructions of order n over B . Then

- i) $*_n$ and every type of order n are *types of order n + 1*.
- ii) If $m > 0$ and $\alpha, \beta_1, \dots, \beta_m$ are types of order $n + 1$ over B , then $(\alpha \beta_1 \dots \beta_m)$ (see T_1 ii) is a *type of order n + 1 over B*.
- iii) Nothing is a *type of order n + 1 over B* unless it so follows from (i) and (ii).

The standard epistemic base assumed for the wide majority of models provided in TIL is as follows:

⁹ As the main topic of the paper is the notion of the existence of individuals, I was a bit concerned about its usage when considering other kinds of objects. To be precise, we do not just assume objects—we assume their existence, at least as far as the system is concerned.

- o: the set of truth-values {T, F};
- ι: the set of individuals (the universe of discourse);
- τ: the set of real numbers (doubling as times);¹⁰
- ω: the set of logically possible worlds (the logical space).

For any type τ , a set of objects of type τ is usually modelled by its characteristic function, which is assigned $(\sigma\tau)$ as its type. Standard intensional entities (individual properties, offices, ...) are modelled as follows: if α is a type, then $((\alpha\tau)\omega)$ is an intension (abbreviated as $\alpha_{\tau\omega}$)—a function from possible worlds ω to chronologies of objects of a particular type $(\alpha\tau)$. Propositions—as intensions into the truth values—are assigned a type $o_{\tau\omega}$.

The specification of the standard epistemic base within TIL includes the basic type of individuals.¹¹ Technically, when TIL provides models over the standard epistemic base, it does not analyse or explicate the members of the base over that base. “The elements of the members of $B[\text{ase}]$ serve as arguments for intensions, and cannot be analysed within TIL without incurring circularity” (Duží, Jespersen, and Materna 2010, 59). The standard model of a sense of a proper name in TIL is a Trivialization of an individual.¹² Duží et al. further characterise the conditions on the use of proper names by competent language users: “(...) the understanding a sense of a name is what enables a language-user to intellectually identify or select the bearer of a name” (Duží, Jespersen, and Materna 2010, 285). Of course, the other standard means for identifying an individual is by the use of a determiner. Following Duží et al., we can present the competence

¹⁰ TIL does allow for infinite domains. Moreover, TIL does not prescribe cardinality on basic types in general. As Tichý stated: “Any domain of initially given objects can serve as a base of infinite hierarchy of *types* of entity, (...)” (1988, 65). The ramified hierarchy of typed objects within TIL is built upon a *base* that is a collection of non-empty and pairwise disjoint collections. The standard epistemic base of TIL contains at least one uncountable basic type—real numbers doubling for times and numbers. The cardinality of individuals is usually not discussed, although nothing seems to be blocking it from being uncountable, too. Nevertheless, TIL does not require that the language has a constant for every object in the domain. The inductive definition of the ramified type hierarchy does not assume this. There is also a particular caution when modelling relations of an agent to intensions or hyperintensions in TIL not to expect, prescribe, or presuppose any grasp on the actual infinite. This is not a problem, however, as investigations into the properties of objects in and defined over uncountable domains are usually done using, at most, a countable language. One needs to be careful when specifying the semantic models of such a language.

¹¹ The notion of ‘base’ is a technical term from the definition of the ramified type hierarchy within TIL—a *base* is a collection of pairwise disjoint, non-empty sets. As such, a base is whatever fulfils this condition. An epistemic base, as the term is standardly used in the TIL literature, is a base *accompanied with an explication of the members of the base*—so it is not just a set of collections of objects ι , o , ω , τ , but these are explicated as sets of individuals, truth-values, possible worlds and real numbers. The term “epistemic” emphasizes the added explication of what the members of the set stand for.

¹² This was discussed in some depth e.g., in Duží, Jespersen, and Materna (2010, ch. 3.2).

to identify and discern among the individuals within the domain as a condition for linguistic competence (of a speaker), which we model.¹³

3. TIL and (non)-existence

In this paper, I focus on how the property of existence is represented within the system. Within this context, existence, as a property of individuals, is modelled as a trivial property—specifically, a property inherent to all individuals for all possible worlds, at all times. Essentially, every individual is attributed with existence; that is the extent of it. Consequently, it becomes implausible to assert the non-existence of an individual based on its representation in TIL. This characteristic of TIL prompts us to reevaluate the well-recognized challenges associated with negative existential claims—statements such as ‘The king of France does not exist.’ or ‘Sherlock Holmes does not exist.’. These challenges are presented as not being fundamentally about the existence of a particular individual but rather pertaining to the status of some office and the occupancy state thereof. From a technical standpoint, the existence of individuals is captured by a constant function, which assigns the truth value *True* to every individual. This representation conforms to the standard model of individual existence within TIL.¹⁴

Popular stances within philosophical logics and analytic philosophy have been devised to discuss and analyse arguments containing non-existent individuals. Various approaches exist for handling this problem. Let’s mention a few. Meinong and his followers present a position according to which “there is indeed an object for every mental state whatsoever—if not an existent object, then at least a nonexistent one” (Reicher 2022, sec. 2). Another popular line of investigations is based on employing the notion of impossible worlds (see, e.g., Berto 2008), and at least some of these presumably contain impossible, non-existent individuals.¹⁵ These lines of

¹³ Although TIL includes the term ‘logic’ in its name, it is not typically regarded as a logic according to the conventional understanding of the term. Classical logic typically involves a definition of language, interpretation, and models. In contrast, Tichý and his followers present their framework and provide semantic models within it. TIL is better understood as a theory of abstract objects and their relations. However, there has been a recent trend in presenting TIL in a format resembling standard presentations of formal theories, see Raclavský (2020). I decided not to present TIL in this form in the paper, as the focus is more on the philosophical motivations behind certain decisions within the system rather than its formal properties.

¹⁴ There has been some discussion about how to model some kinds of non-trivial existence, but then it was understood rather as properties like *having a mass*, *being positioned in space and time*, etc. See, e.g., Raclavský (2010).

¹⁵ Philosophical analysis of fictional contexts presents another wide domain of stances dealing with the apparent existence of fictional characters—non-existent objects par excellence, see e.g. Zalta (2003).

investigations can be considered a ‘bottom-up’ approach, as they present an enrichment of the domain in one way or another.

TIL adopts a robust ‘top-down’ approach when considering the notion of existence. Apparent examples of non-existent individuals are usually analysed as (hidden) individual offices (e.g., *Pegasus* is really the winged horse, *Vulcan* is really the particular planet in an orbit between Mercury and the Sun, etc.). This way, TIL does not need to posit a particular metaphysics involving non-existent particulars. It elucidates the semantics of language contexts seemingly dependent on such concepts by utilising notions already available in its conceptual framework (office, hyper-office, etc.).¹⁶ This approach enables TIL to circumvent the need to posit problematic features such as two primitive kinds of predication or a distinction between nuclear and extranuclear properties.¹⁷

4. Why existence *has to be* a trivial property

This section is dedicated to presenting the argumentation in favour of the proposed model of individual existence as a trivial property within TIL. The primary argumentation line, articulated by Tichý, encapsulates the core of this perspective. Below, I highlight the essential elements of this argumentation along with some additional commentary.¹⁸ Tichý’s central argument aims to refute the notion of a fluctuating universe of individuals, specifically countering the idea that the same set of individuals does not belong to each world:

Indeed the most widespread view of possible worlds is to the effect that although worlds do share objects, they do so on a selective basis: the universe of discourse, it is assumed, may expand and/or contract from world to world.

(...)

¹⁶ See, e.g., Duží, Jespersen, and Glavaničová (2021).

¹⁷ TIL enables us to distinguish between a predication *de dicto* and a predication *de re*. This distinction can be nicely seen in the analysis of the meanings of sentences concerning predication to the offices, in contrast to the sentences with predication to the occupants (if any) of the offices. We predicate *de dicto* when we assign a property (of offices) to the office itself, e.g., ‘The president of the USA is an elected office.’ We predicate *de re* when we assign a property (of individuals) to the occupant of the office, e.g., ‘The president of the USA is a white male.’ From a technical standpoint, both predications are grasped by the use of Composition, which presents an application of a function to an argument. The difference between *de dicto* and *de re* predication is then modelled by different functions applied to different objects within these models—there is usually an extensionalization process when we predicate *de re*. This poses no issues since it does not introduce new primitive notions; it only enables us to grasp the semantic difference using notions already in place. On the other hand, Zalta’s theory assumes the introduction of two distinct primitive types of predication: *exemplifying* and *encoding*.

¹⁸ This argumentation is accepted by virtually all researchers working in TIL.

An individual which is present in the actual world may, on this view, be missing from some alternative worlds, and conversely, an individual which is to be found in some alternative worlds may be missing from the actual world.

(...)

This view is popular, but not easy to defend. (Tichý 1988, 180)

Tichý proceeds to challenge the conception of ‘possibilia’, referring to objects that do not exist in the actual world but are posited to exist in some other world.¹⁹ He urges the proponents of this position to provide precise specifications for such objects, contending that such precision is unattainable.²⁰ Tichý articulates his argument concisely. He challenges anyone to provide at least one example of an individual missing from the actual world. He begins with the standard example of Pegasus. Which particular individual is Pegasus? The standard reply—it is the winged horse—fails to designate an individual in the actual world and presumably does not uniquely specify a *sole* candidate in a world in which it exists. However, for the sake of the argument, let’s consider a particular world that contains the unique winged horse. How can one be certain that the winged horse there is not one of the wingless horses in the actual world—possessing wings is presumably a contingent property. So, something more is needed. Specifically, a claim that the unique winged horse in the considered world is numerically distinct from any individual in this world. But presumably, there is more than one non-existent individual (if we do not want to beg the question). According to Tichý “[t]o be able to exploit the determiner in pinpointing such an individual, one has to have an epistemic handle on the individual’s numerical identity in the first place” (1988, 181). I concede that his reasoning up to this point is sound.

Now, let’s focus on the point that Tichý does not stop here—i.e., he is not satisfied by dismantling a position about the possibility of an individual not existing in the actual world but existing in some other possible world.

¹⁹ Tichý (1988, ch. 36) utilised the distinction between actual and alternative/possible worlds, at least when presenting his arguments against the idea of varying domains of individuals. He did not, however, base these arguments concerning the existence of individuals on any particular logic. Instead, he focused on presenting the limitations of certain positions, following some basic assumptions. I do not presume any particular logic behind my counterargument either. Although I am well aware that Tichý does provide an explication of his notion of worlds by introducing the notion of ‘determination system’ (see Tichý 1988, 197ff). Nevertheless, he presents his arguments against the varying universe of individuals without the reference to this explication, which only followed several pages after this particular line of argumentation. TIL is developed with a strong ‘anti-actualist’ stance (see Duží, Jespersen, and Materna 2010, ch. 2.4.1). I do not presume, however, that either Tichý’s argumentation or my counter-argumentation depends on a particular notion of an actual world. Both can be reformulated without the need to use this particular term. I acknowledge that the specification of the actual world would amount to omniscience.

²⁰ It is presented in a concise way in Tichý (1988, 179ff).

He goes on and, in his words, *per impossibile*, grants that “we have managed to focus on a specific non-existent individual” (Tichý 1988, 182). He continues:

(...) what evidence could we possibly have that it indeed fails to exist? If existence is something that an individual may have or lack, then the question whether it lacks it is a factual one and cannot be answered *a priori*. Just as one cannot be sure that an individual fails to be golden without subjecting it to a goldenness test, so (on the view under consideration) one cannot be sure that it fails to exist without subjecting it to an *existence test*. Yet the idea of testing an individual for existence is grotesquely absurd. (Tichý 1988, 182)

This is a famous argument of the test, respected and repeated on many occasions in TIL literature. However, claims of absurdity can be seen as suspicious, as what is absurd for one can be the basis for a career for another.

5. Devil is in the details

Having presented the arguments against the position advocating varying domains of individuals in TIL, let’s now delve deeper into the intricacies of these arguments. This section aims to shed light on certain problematic aspects within the argumentation.

Tichý initially agrees that the concept of a fluctuating universe of individuals suggests that some individuals, not existing in this world, do exist in some other possible worlds, and *conversely*, some individuals existing in this world do not exist in some other worlds. However, the initial part of his argument primarily addresses just one aspect of this possibility. Specifically, he argues against the feasibility of specifying an individual that doesn’t exist in the actual world but exists in some other possible world—he argues against *possibilia*. It is crucial to note that this argument does not inherently challenge the alternative possibility: an individual existing in the actual world but not existing in some other possible world. This aspect is *not* directly addressed in the initial part of Tichý’s argument (i.e., in his argumentation against *possibilia*).

It’s worth noting that Tichý, seemingly recognizing the potential limitations of his initial argument, proceeded to present another, ostensibly more robust, argument against the concept of non-trivial existence considered as a property of individuals. This subsequent argument, if valid,

would effectively eliminate the possibility of such a property within the TIL framework.

However, it is essential to emphasize that, even in the case of this second argument, there remain questions regarding its validity.²¹ In the following, I outline my reasons for asserting the second argument's potential shortcomings and invite a critical examination of its claims.

Here's my reasons. Let's, once again, present the argument of the test in full:

If existence is something that an individual may have or lack, then the question whether it has or lacks it is a factual one and cannot be answered *a priori*. Just as one cannot be sure that an individual fails to be golden without subjecting it to a goldenness test, so (on the view under consideration) one cannot be sure that it fails to exist without subjecting it to an *existence test*. Yet the idea of testing an individual for existence is grotesquely absurd. If the individual does not exist, it is simply not available for testing; and if it *is* available then it is entirely futile to proceed with the test, because it is clear already that it exists. An existence test for individuals, whatever it might consist in, would have to be one which cannot possibly yield a negative result. (Tichý 1988, 182)

It is my contention that Tichý, in his argument, takes a logical step that lacks sufficient substantiation. Specifically, he makes a critical move from the assumption that existence is a property an individual may have or lack to an intermediary conclusion that it is a factual property, hence rendering it unanswerable *a priori*. This logical step is crucial for Tichý's subsequent argumentation, wherein he posits the absurdity of empirically testing such a property. However, Tichý did not adequately support this logical transition. Tichý appears to consider two following concepts as co-extensional: *non-trivial individual property* and *empirically testable individual property*.²² He relies on the assumption that for us to claim that an individual possesses a non-trivial property, it must necessarily undergo a factual testing. However, this is not a universally applicable principle. There exist non-trivial individual properties that can be assigned to an individual without the requirement of empirical testing. I do not contend that numerous trivial properties do not warrant empirical testing, but I posit

²¹ Even if it is respected by virtually all within the TIL community.

²² Even this may be too strong a claim. Tichý's argument assumes that any non-trivial individual property is an empirical one. He does not need the converse to be true.

that not all non-trivial individual properties follow this pattern. Essentially, even if an individual property, assignable to an individual only after factual testing and hence, modelled as a non-trivial property within the system, exists, it does not automatically imply that any non-trivial individual property must be empirically testable. In simpler terms, while we may model empirical properties using non-trivial ones, this does not establish a one-to-one correspondence (or a subsumption), wherein every non-trivial property must be empirical in nature.

Let's demonstrate this. Let's assume that we have several possible worlds in our domain—say w_1, w_2 , etc. By having these in the domain we can mention them explicitly in the linguistic statements (the same way we do with individuals). Now, let's specify this property: 'being identical to oneself and being such that the world is w_1 '. Although it could sound strange, it is along with the properties like 'being such that it's raining' or 'being such that one plus one equals two'.²³

Employing the notion of construction as well as the definition of the ramified type hierarchy, we can specify the Closure, which v -constructs such an individual property.²⁴ Let's present the standard type assignment:²⁵ $w/*1 \rightarrow \omega, x/*1 \rightarrow \iota, w_1/\omega, \&/(\omega\omega), =_i/(\omega\iota), =_\omega/(\omega\omega\omega)$, then

$$\lambda w[\lambda x [^0\& [^0=_i x x] [^0=_\omega w ^0w_1]]]$$

v -constructs an individual property, which all individuals possess in world w_1 and no individual possesses in any other possible world.²⁶ This is an example of a construction of an individual property that is non-trivial, but we do not need an empirical testing to acknowledge it is so.²⁷ This property is possessed by all individuals *only* in the world w_1 .²⁸ No individual possesses this property in any other world. We know this *a priori*, without testing. And it is an example of a non-trivial individual property. This is therefore an example demonstrating that Tichý's argument of test is based

²³ Similar kinds of individual properties (individual is such that ...) were discussed within modern debate over connections of essentialism and modality. See, e.g., Fine (1994) and Wildman (2016).

²⁴ I do not use a temporal index for simplicity in the paper.

²⁵ The type assignments to the parts of the semantic model presented do not deviate in any way from the usual type assignments. The example does not rely on any deviation in typing.

²⁶ In more detail, this is a Closure, which v -constructs a function from possible worlds into objects v -constructed by $\lambda x [^0\& [^0=_i x x] [^0=_\omega w ^0w_1]]$. This second Closure v -constructs a function from individuals into truth values v -constructed by $[^0\& [^0=_i x x] [^0=_\omega w ^0w_1]]$ —which depicts a conjunction of the statement 'individual is identical to itself AND the world is identical to w_1 '. As such, this condition is fulfilled by all individuals with respect to the particular possible world w_1 and nowhere else (as the second condition: the world is identical to w_1 , is fulfilled only with respect to w_1).

²⁷ It also does not belong to the class *Triv* discussed by Duží, Jespersen, and Materna (2010, sec. 1.4.2.1).

²⁸ I am not using the temporal index for simplicity.

on an unsubstantiated assumption about the subsumption of extension of the notion of non-trivial property under the extension of the notion of an empirical property.

The proponents of TIL do not assign any priority to the actual world. So, it is much in line with the suggestion that the actuality is only a contingent property of a possible world. Consider that the world w_b happens to be actual (or that w_b is actual from the viewpoint of w_b). Then Tichý's argumentation does not block the possibility of there being another possible world that has even fewer individuals than those that occupy w_b . I acknowledge that the world w_a is probably not graspable from the viewpoint of w_b —as, by assumption, w_a is occupied by more individuals than w_b . However, this is not a concern, as the epistemic and conceptual possibilities, *as far as the individuals within that world are concerned*, can and do vary across possible worlds. Tichý's argumentation was against conceivability of the exact specification of a particular individual not existing in the actual world (whichever world being actual). My counter-argumentation does not face this challenge—from any world that happens to be the actual, we *can* consider worlds that comprise even less individuals than that world—the problem of specification does not appear in that scenario.

Section 1.4.2.1 in Duží, Jespersen, and Materna (2010) provides a detailed analysis of various kinds of individual properties. What is important for the purposes of the paper and for the specification of non-trivial properties is the class of trivial properties, $Triv/(o(ot)_{\tau_{\omega}})$, as defined: “To sum up, a property P belongs to the class $Triv$ iff P has a non-empty essential core EC . Individuals belonging to EC have P necessarily” (Duží, Jespersen, and Materna 2010, 68). Now, is the example of an individual property used in my counterargument to Tichý a case of a trivial individual property in this manner? No, it is not, because it does not have a non-empty essential core. There is no individual that possesses this property in every possible world. Duží, Jespersen, and Materna (2010) adopt the concept of ‘essential core’ as introduced by (Cmorej 1996). The essential core of a property refers to a subset that exists in every possible extension of the property. In the context of individual properties, the essential core consists of individuals who possess the property in every possible world. It follows straightforwardly from this definition that the individual property in my counter-example above lacks a non-empty essential core. This is because it is a property with an empty extension in all possible worlds except w_1 .

This counter-argument seems to be relying on a world-indexing ‘trick’, like ‘the US President at world w_1 ’. Within TIL, one can create an artificial property that no individual possesses except in one particular world (thanks

to world-indexing) and which is nontrivial. The idea is as follows: with a non-empty collection of possible worlds within the base, multiple constructions construct these worlds. For instance, for every world within the type ω , there is a Trivialization of the world, as defined by the notion of construction and ramified type hierarchy. Consequently, having a particular world within the type implies the existence of its Trivialization within the ramified hierarchy. As a result, there are more complex constructions containing this Trivialization as a constituent.

I want to emphasize the artificiality of the example. Nevertheless, Tichý's argumentation was not exclusively aimed at 'non-artificial' individual properties but rather at all of them. Therefore, the argument of the test is susceptible to critique even with these kinds of examples. Once we establish that there are non-trivial individual properties, the extensions of which we can establish with respect to particular worlds without the need of empirical testing, the logical relation that Tichý's argument of test presumes no longer holds. These kinds of intensional entities, as well as constructions v -constructing these, do exist over the standard epistemic base of TIL. Therefore, we must consider them. If we leave them out, we are compelled to provide some arguments for this omission. Tichý's argumentation did not address these aspects.

I should add that it is not a standard practice to include Trivializations of particular possible worlds within the models usually presented in TIL-based research. Duží et al. explicitly emphasize this point in their methodology: "However, as we prefer to understand explicit intensionalization, the method is restricted to *variables* ranging over possible worlds, which may then be bound in a variety of ways" (Duží, Jespersen, and Materna 2010, 179). This is a *preference* rather than an inevitable route. Perhaps the simplest way to strengthen Tichý's argument concerning the analysis of existence is to limit the area of applicability of his arguments to the individual properties graspable via these kinds of constructions (i.e., including at most variables for possible worlds, not Trivializations). However, such a move would require further argumentation to avoid being *ad hoc*, especially considering the argumentation about triviality of existence as an individual property.

We can even agree with Tichý that if existence is to be modelled by an empirical property, it runs into absurdities. But the idea of varying domains is not identical to the claim that individual existence needs to be a factually testable property. A logician trying to analyse logics over such kinds of logical spaces need not to employ this assumption.

One could nevertheless ask whether the notion of a possible world, as implemented in TIL, consequently forces the individual existence to be a trivial property. Not really. Even if we begin with the pre-theoretical assumption that a possible world is understood as maximally consistent totality of facts, we need not model existence as a trivial property. TIL is based over partial functions and it is quite possible to model the statements containing individual names with respect to a world in which it does not exist, e.g., by partial propositions.

6. Conclusion

This paper evaluated the arguments supporting the assumed constant universe of individuals for all possible worlds within the framework of TIL and the models provided within it. The analysis delves into the core steps of these arguments and finds them lacking. The upshot is that the assumption need not be considered unalterable within the framework, even though it appeared as such for so long.

I do not intend to assert this as my definitive stance, however. Instead, I present it as a position that was not entirely refuted by Tichý's argumentation, even though it is widely assumed to be so by virtually all researchers in TIL. It is plausible that such a model of individual existence could lead to unwelcome consequences.

The notion of a constant domain of the universe is pivotal in choosing particular models within the ramified hierarchy of TIL. If the domain was not constant it could potentially necessitate changes in the models of several crucial notions, such as requisite. This could be undesirable, given that much research has been conducted under the presupposition of a constant domain. This paper is not a call for revision, but rather an invitation to provide additional arguments or bolster the existing ones to reinforce the assumption of a constant domain of universe for the semantic models of natural language phenomena in TIL.

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REFERENCES

- Berto, Francesco. 2008. “Modal Meinongianism for Fictional Objects.” *Metaphysica* 9: 205-218.
<https://doi.org/10.1007/s12133-008-0033-z>.
- Cmorej, Pavel. 1996. “Empirické esenciálne vlastnosti (eng. “Empirical Essential Properties”). *Organon F* 3 (3): 239-261.
- Duží, Marie. 2017. “Property Modifiers and Intensional Essentialism.” *Computación y Sistemas* 21 (4): 601-613.
<https://doi.org/10.13053/CyS-21-4-2811>.
- . 2019. “If Structured Propositions are Logical Procedures then How are Procedures Individuated?” *Synthese, special issue on the Unity of propositions* 196 (4): 1249-1283.
<https://doi.org/10.1007/s11229-017-1595-5>.
- Duží, Marie, and Bjørn Jespersen. 2015. “Transparent Quantification into Hyperintensional Objectual Attitudes.” *Synthese* 192 (3): 635-677.
<https://doi.org/10.1007/s11229-014-0578-z>.
- Duží Marie, Bjørn Jespersen, and Daniela Glavaničová. 2021. “Impossible Individuals as Necessarily Empty Individual Concepts.” In *Logic in High Definition. Trends in Logic (Studia Logica Library)* 56, edited by Alessandro Giordani and Jacek Malinowski, 177-202. Cham: Springer.
https://doi.org/10.1007/978-3-030-53487-5_9
- Duží Marie, Bjørn Jespersen, and Pavel Materna. 2010. *Procedural Semantics for Hyperintensional Logic. Foundations and Applications of Transparent Intensional Logic*. First edition. Berlin: Springer.
- Fine, Kit. 1994. “Essence and Modality: The Second Philosophical Perspectives Lecture.” *Philosophical Perspectives* 8: 1-16.
<https://doi.org/10.2307/2214160>.
- Glavaničová, Daniela. 2018. “Fictional Names and Semantics: Towards a Hybrid View.” In *Objects of Inquiry in Philosophy of Language and Literature. Studies in Philosophy of Language and Linguistics*, edited by Piotr Stalmaszczyk, 59-73. Berlin: Peter Lang.
<https://doi.org/10.3726/b14249>.

- Jespersen, Bjørn. 2015. "Structured Lexical Concepts, Property Modifiers, and Transparent Intensional Logic." *Philosophical Studies* 172: 321-345.
<https://doi.org/10.1007/s11098-014-0305-0>.
- . 2019. "Anatomy of a Proposition." *Synthese* 196: 1285-1324.
<https://doi.org/10.1007/s11229-017-1512-y>.
- Jespersen, Bjørn, and Marie Duží. 2022. "Transparent Quantification into Hyperpropositional Attitudes De Dicto." *Linguistics and Philosophy* 45: 1119-1164.
<https://doi.org/10.1007/s10988-021-09344-9>.
- Kosterec, Miloš. 2020. "Substitution Contradiction, Its Resolution and the Church-Rosser Theorem in TIL." *Journal of Philosophical Logic* 49: 121-133. <https://doi.org/10.1007/s10992-019-09514-y>.
- Raclavský, Jiří. 2010. "Co obnáší kontingentní existence individuí." *Organon F* 17 (3): 374-387.
- . 2020. *Belief Attitudes, Fine-Grained Hyperintensionality and Type-Theoretic Logic*. Studies in Logic 88. London: College Publications.
- Reicher, Maria. 2022. Nonexistent Objects. *The Stanford Encyclopedia of Philosophy* (Winter 2022 Edition). Edited by Edward N. Zalta & Uri Nodelman. Accessed April 2024.
<https://plato.stanford.edu/archives/win2022/entries/nonexistent-objects/>.
- Tichý, Pavel. 1988. *The Foundations of Frege's Logic*. Berlin and Boston: De Gruyter.
<https://doi.org/10.1515/9783110849264>.
- Wildman, Nathan. 2016. "How (not) to be a Modalist about Essence." In *Reality Making*, edited by Mark Jago, 177-196. Oxford: Oxford University Press.
<https://doi.org/10.1093/acprof:oso/9780198755722.003.0009>.
- Zalta, Edward N. 2003. "Referring to fictional characters." *Dialectica* 57 (2): 243-254. <https://doi.org/10.1111/j.1746-8361.2003.tb00269>.

