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DECOUPLING EDWARD ZALTA'S INTENSIONAL LOGIC FROM HIS METAPHYSICS OF INTENTIONALITY (71 pp.)

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In Edward Zalta's *Intensional Logic and the Metaphysics of Intentionality*, Zalta postulates an intensional logic and corresponding intentional metaphysics that purports to solve four well known puzzles concerning four logical principles that Zalta calls '*Existential Generalization*', 'Strong Extensionality', 'Existential Generalization', and 'Substitutivity'. In doing so, Zalta proposes a metaphysics that is more expansive than many metaphysicians are comfortable committing to. This thesis will investigate the extent to which a commitment to Zalta's metaphysics is necessary in order to utilize his intensional logic. I argue that the nominalism of Jody Azzouni presented in *Deflating Existential Consequence: A Case for Nominalism* is uniquely suited to allow the nominalist to utilize Zalta's intensional logic without a commitment to Zalta's metaphysics I further argue that the nominalism of Jody Azzouni allows for a complete adoption of Zalta's treatments of '*Existential Generalization*', 'Strong Extensionality', 'Existential Generalization', and 'Substitutivity' without entailing a commitment to Zalta's metaphysics.

DECOUPLING EDWARD ZALTA'S INTENSIONAL LOGIC FROM HIS METAPHYSICS OF INTENTIONALITY

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Chapter 1: Introduction

In Edward Zalta's *Intensional Logic and the Metaphysics of intentionality*,[1] Zalta posits a logic and accompanying metaphysics that claims to account for four apparent and well-known problems in philosophy of language. The problems are *Existential Generalization* (note the use of italics), Strong Extensionality, Existential Generalization, and Substitutivity. The metaphysics that accompanies the logic and solutions is more expansive than many metaphysicians are comfortable with. This is to say that it posits more types of entities than many metaphysicians are willing to countenance. However, the logical system is undoubtedly interesting and incredibly expressive. As such, an inquiry into whether the logical system may be of wider appeal than the metaphysics is in order. In other words, might those with a distaste for the radically expansive metaphysics of intentionality still find some appeal in the logic? The inquiry conducted in this thesis will take the form of investigating whether and the extent to which a nominalist might make use of the logic while remaining consistent with a nominalist metaphysics.

Existential Generalization **and** ***Strong Extensionality***

Existential Generalization is a principle that states that, for sentences of natural language that contain a denoting expression, the denoting expression in that sentence can be replaced with the phrase 'something that exists'.[2] For example, from the sentence 'I love Pabst Blue Ribbon', it seems unproblematic to infer the sentence 'I love something that exists'. However, this inference

[1] Zalta, Edward N. *Intensional Logic and the Metaphysics of Intentionality*. MIT Press, 1988.
[2]Ibid, 3-4.

seems to break down in cases such that the denoting expression does not denote an object that exists. From the sentence 'John fears Cthulhu',[3] it is seemingly *not valid* to infer the sentence 'John fears something that exists'.

The apparent problems that result from *Existential Generalization* generally concern intentional (notice the second 't') states. Intentionality, as Zalta describes it, is the property that certain mental states and events have in virtue of being directed toward, or about, something.[4] In other words, when some person has a mental state or event that is intentional in this sense, that state or event is about *something.*[5] Suppose that I were to love Pabst Blue Ribbon beer. My mental state of loving is directed toward or about something. It is about a particular brand of beer. It makes no sense for me to have a mental state of mere loving. The loving, as an intentional state, must be about something.

My example of the apparent failure of *Existential Generalization* uses the intentional state of fearing. Cthulhu does not (I hope) exist. However, John might still fear Cthulhu regardless of the existence of Cthulhu. Zalta notes that similar problems arise with the sentences 'Sherlock Holmes still inspires modern detectives' and 'Ponce de Leon searched for the fountain of youth'. Both inspiring and searching are intentional states. However, neither Sherlock Holmes nor the fountain of youth exist. Zalta will maintain that intentional states need to be about something. However, according to Zalta, these things do not need to exist. As such, Zalta is metaphysically committed to non-existent objects. So, he will have to develop a logic that

[3] Cthulhu is a fictional creature from the H.P. Lovecraft short story 'Call of Cthulhu'. Lovecraft, H. P. "The Call of Cthulhu." Essay. In *The Complete Fiction of H.P. Lovecraft*, 381–407. New York, NY: Chartwell, 2016.
[4] *Intensional Logic and the Metaphysics of Intentionality*, 10.
[5] Among the intentional states are loving, hoping, fearing, and believing.

distinguishes between there being an object and there being an object that exists. This is not something that classical logics generally have the resources to do.

Another problem that arises in the philosophy of language relates to the principle of Strong Extensionality. This principle invokes the notion of the extension of predicates. The extension of, e.g., a one place predicate, is just the set of things that satisfy that predicate. For example, the extension of 'telephone' is just the set of objects that are telephones, e.g., individual payphones, smartphones, rotary phones, satellite phones, etc. The principle of Strong Extensionality concerns the extensions of two predicative expressions. I will call them 'F' and 'G'.[6] The principle states that from the sentence 'Necessarily, all and only F's are G's' it is valid to infer the sentence '*Being an F* is the same thing as *being a G*.'[7] So, according to Strong Extensionality, from the sentence 'Necessarily, all and only bachelors are unmarried men' it would be valid to derive '*Being a bachelor* is the same thing as *being an unmarried man*'. However, there are apparent counterexamples to this principle as well. Relevantly, the principle breaks down when predicates that no existing object can satisfy are used. For example, from the sentence, 'Necessarily, all and only married bachelors are brown and colorless dogs' one cannot infer '*Being a married bachelor* is the same thing as *being a brown and colorless dog*'. The extension of the two predicates is necessarily coextensive given that no object could be either a married bachelor or a brown and colorless dog. The extension of both is the null set. Having said this, *being a married bachelor* seems to be a different thing than *being a brown and colorless dog*. As such, the second sentence seemingly cannot be derived from the first. So, although the

[6] It is important to note that the fact that two predicates happen to have the same extension does not entail that those predicates predicate the same thing of the objects in their shared extension. *Being a creature with a heart* and *being a creature with a kidney* have the same extension. But *being a creature with a heart* might be different than *being a creature with a kidney*.
[7] *Intensional Logic and the Metaphysics of Intentionality*, 6.

sentence ‘necessarily all and only married bachelors are brown and colorless dogs’ is true, ‘*Being a married bachelor* is the same thing as *being a brown and colorless dog*’ is plausibly false.[8]

The discussion thus far will allow me to motivate Zalta’s project a bit better. In his book, Zalta develops an intensional logic (notice the ‘s’). Intensionality is commonly defined, though not by Zalta, as non-extensionality. Let us suppose that ‘rectangular thing over there’ has the same extension as ‘square thing over there’ because every rectangular thing over there happens to be a square thing. But, those two predicate expressions are non-synonymous because 'rectangular thing over there’ and ‘square thing over there’ mean different things. This difference in meaning can be captured by saying that, while the two predicates have the same extension, their intensions differ. Zalta defines intensionality as a property that certain sentences have when they seemingly invalidate inference patterns that we intuitively take to be valid. Zalta posits that intensional logics are “formal systems for representing and explaining the apparent failure of various logical principles.”[9] Intensional logics are needed given that classical first order logic and classical modal logics lack the resources to explain the failures of *Existential Generalization* and Strong Extensionality respectively.[10] The apparent counterexamples to the principles of *Existential Generalization* and Strong Extensionality discussed above are two of four problems Zalta’s intensional logic explicitly seeks to address.

[8]Ibid, 6-7.
[9] Ibid, 3-4.
[10] Classical logic similarly lacks the resources to address two other problems of intensionality not yet discussed.

Brief Metaphysical Discussion

To begin a discussion about Zalta's metaphysics, Zalta postulates properties (thought of as universals) and abstract individuals. Something is a universal if it is (or can be) instantiated at distinct spatial regions at one and the same time. This is in contrast to individuals, which can only be located at a singular spatial region at any given time. Take, for example, the property of *being brown*. To the extent that it is a universal, this property can be seen as having many instances at distinct spatial regions. In my room alone, my dog is brown, there is a brown pen sitting on my desk, and I own brown bookshelves on which I store many brown books. While I have many things that instantiate the property of *being brown*, the property *being brown* itself may either be taken as wholly present in each of the spatial regions at which it is instantiated, or as an abstract entity that does not itself have a location in spacetime.

Relations, too, Zalta takes to be universals. When so taken, they can have instances located at multiple spacetime regions. Where they differ from properties is that relations are not instantiated by individual objects, as relations involve multiple objects. If X is taller than Y, X bears the relation of *being taller than* to Y. Relations, further, are not instantiated by mere sets of objects, but by ordered sets of objects.[11] Take for example the pen on top of my desk. The pen is said to bear the relation of *being on top of* to the desk. And, the relationship is instantiated, in this case, by the pen and the desk in that order. Relations like the one my pen bears to my desk are said to be binary. That is to say that the ordered set that is an instance of the relation is an ordered pair. But, some relations require more than two relata. Take, for example, the relation of *being in between*. If some object is in between other objects, that relation will have a minimum of three relata. And, we would not call the thing instantiating that relation an ordered pair, as it is not a

[11] Of the form '<x,y>'.

pair. It is instead an ordered triple. In general, an n-place relation is instantiated by an ordered n-tuple of objects.[12]

In addition to postulating universals and ordinary individuals (such as the pen and my desk), Zalta also postulates abstract individuals. If an individual is ordinary, then it is the kind of thing that could, at some time, have a location in space. If an individual is abstract, it is not the kind of thing that could, at some time, have a location in space.[13] Given the term 'abstract individual' it should be clear that abstract individuals are not instantiated at multiple spacetime locations. They are individual or particular rather than universal. Take, for example, the number two. We do not say of it that it has multiple instances in spacetime regions. Further, the number two has never had, does not, and will never have a location in spacetime. So, on a Zaltian metaphysics, the number two is an abstract individual.

Zalta's ontological posits (universals, abstract individuals, and others I have not outlined here) are controversial. They are especially controversial for the nominalist, who stands in almost diametric ontological opposition to Zalta's metaphysics. Appeal to a nominalist ontology will be an important evaluative tool in my analysis of Zalta's intensional logic. As such, I will say a little about it here: A nominalist is one who generally rejects universals. According to the nominalist, everything is particular.[14] In the case of a Zaltian metaphysics, the nominalist ontology will not contain the properties and relations postulated by Zalta as they are taken to be universals. The nominalist will also reject abstract entities broadly. Everything the nominalist is willing to countenance has a location in spacetime.[15] This disqualifies abstract individuals as

[12] Of a form such as '<x,y,z, …n>'
[13] *Intensional Logic and the Metaphysics of Intentionality*, 21.
[14]Rodriguez-Pereyra, Gonzalo. "Nominalism in Metaphysics." Stanford Encyclopedia of Philosophy, April 1, 2015. https://plato.stanford.edu/entries/nominalism-metaphysics/.
[15] Ibid.

invoked by Zalta, as it is not possible for abstract individuals to ever have location in space. Having said this, many nominalists do acknowledge an apparent need to include sets in their ontologies.

A Helpful Metaphor

At this point the reader should have sufficient foundational knowledge to understand the overarching goal of this thesis. I intend to answer to what extent a commitment to the metaphysics of intentionality (especially insofar as it involves a commitment to universals and abstract individuals) as developed by Edward Zalta is required to use the intensional logic to solve the issues it sets out to solve. To explain, I would like to use a rather morbid example. Imagine with me the case of the atheist alcoholic. We'll call him 'George'. George wants to get sober. In fact, he has been court mandated to attend Alcoholics Anonymous to aid in his sobriety. This is all well and good except for the fact that George is an atheist. George maintains that there is no God. Upon receiving a copy of *Twelve Steps and Twelve Traditions* he is dismayed. He would like to solve his problems with alcohol abuse. But, to do so, according to *Twelve Steps and Traditions,* he must invoke God. Among the Twelve Steps are:

- Coming to believe that a Power greater than ourselves could restore us to sanity.
- Deciding to turn our will and our lives over to the care of God as we understand Him.
- Admitting to God, to ourselves, and to another human being the exact nature of our wrongs.
- Become entirely ready to have God remove all these defects of character.
- Humbly asking God to remove our shortcomings.
- Seeking through prayer and meditation to improve our conscious contact with God, as we understand Him, praying only for knowledge of God's will for us and the power to carry that out.[16]

[16] *Twelve Steps and Twelve Traditions*. New York: Alcoholics Anonymous World Services, 1981, 5-9.

The question, then, is to what extent must George commit himself to an ontology containing God to solve his alcohol problem? Yes, George rejects God metaphysically. But, is there some way he might explain away apparent references to metaphysical entities that he rejects in such a way that he might still follow the Twelve Steps and solve his alcohol problem? George, in this example, serves as a test case. One might use the thought experiment of George the atheist alcoholic to understand the extent to which the invoked deity can be divorced from the process by which one obtains sobriety in Alcoholics Anonymous.

The nominalist will serve as the test case for my purposes in this thesis. I will explore the extent to which the nominalist, who rejects Zalta's metaphysics, can nonetheless adopt Zalta's intensional logic to solve various problems of intensionality. Like the atheist alcoholic seeking to use the Twelve Steps, the nominalist rejects key entities invoked in Zalta's metaphysics. This nominalistic foil should provide a test case to evaluate to what extent what Zalta calls 'the metaphysics of intentionality' can be divorced from Zalta's Intensional logic. Just like George, the nominalist may want to utilize Zalta's intensional logic to solve the problems presented above. So, if a nominalist can explain away the apparent reference to the universals and abstracta (among other posits) invoked by Zalta, there is reason to believe that the nominalist can make use of the logic while remaining consistent with nominalist metaphysics. And, if it is the case that Zalta's intensional logic can be, in such a way that satisfies the nominalist, divorced from his corresponding metaphysics of intentionality, the logic will be of wider interest than it might otherwise appear.

Roadmap

I would like to conclude this first chapter with a roadmap for the chapters ahead. In chapter 2, I will discuss in detail how Zalta's l metaphysics and logic purports to solve the problems of *Existential Generalization* and Strong Extensionality. This will be accompanied by and interlaced with explanations of the metaphysics and logical theory required for said solutions. Chapter 3 will be focused on both an introduction to Jody Azzouni's nominalism and how that nominalism will provide nominalist adoptions of Zalta's treatment of *Existential Generalization* and Strong Extensionality. Chapter 4 will first introduce the problems of Substitutivity and Existential Generalization. Then, I will explain how Zalta's logic and metaphysics provide solutions to those problems. This will require an explanation of some radical expansions to both the logic and the metaphysics. Finally, in Chapter 5 I will address how it is that a nominalist might adopt Zalta's solutions to Substitutivity and Existential Generalization. Further, I will evaluate to what extent the nominalist might be able to adopt Zalta's treatment of the four logical principles in conjunction with one another. In other words, I will investigate to what extent a nominalist adoption of Zalta's treatment for each principle might contradict an adoption of any other Zaltian treatment. I conclude in chapter 5 that the Azzounian nominalist can unproblematically adopt Zalta's treatment of all four logical principles.

Chapter 2: The Implications of Zalta's Intensional Logic and Metaphysics of Intentionality for *Existential Generalization* and Strong Extensionality

The material I have presented in Chapter 1 will not get us to Zalta's solution for the purported problem instances of Strong Extensionality. I would like to remind the reader, here, that Zalta's ontology includes universals and abstract individuals in addition to ordinary individuals. Further, the difference between abstract and ordinary individuals concerns whether the individual can, at some time, have a location in space. In addition to that material, and to properly present the supposed solution, I will need to provide a more detailed account of Zalta's intentional metaphysic. This will include an explanation of Zalta's accounts of properties, relations and propositions. In the second section, I will discuss a difference in the way that Zalta claims that ordinary and abstract individuals instantiate their properties. Later, I will explain Zalta's theory of times and possible worlds. This will allow for a discussion of Zalta's rejection of Strong Extensionality. Finally, an explanation of some of the syntax, semantics, and axioms of Zalta's intensional logic should allow for an explanation of his solution to the putative counterexamples to *Existential Generalization*.

Properties, Relations and Propositions

Formal logic students learn that certain phrases such as 'is brown' or 'is old' are represented as 1-place predicates. Further, they learn that relational expressions such as 'is taller than' or 'is in between' are represented as n-place predicates where $n \geq 2$. Additionally, propositional variables such as 'P' and 'Q' represent whole propositional contents and can be

thought of as 0-place predicates. Zalta's theory of properties[17] mirrors this structure. 1-place predicates denote 1-ary properties, relational expressions denote n-ary properties where n ≥2, and propositions are 0-ary properties.[18] As such, relations and propositions are species of properties on this view.[19]

Zalta's theory of propositions, though, requires more explanation. Zalta conceives of propositions as structured entities. These entities have constituents and a logical structure. Zalta states, "The constituents of a proposition are the properties and objects that it has as parts."[20] In other words, a proposition is just composed of various properties and individuals arranged in a certain way. And, if that proposition is a true proposition, there is nothing outside of the way its constituents are in fact arranged that makes it true. If the structure of the proposition is the way things in fact are, the proposition is true. For example, the proposition expressed by the sentence 'The Statue of Liberty is made of copper' has as its constituents the property of being made of copper and the ordinary individual the Statue of Liberty. Further, the property and individual are in fact arranged in such a way that the proposition is true.

Exemplification and Encoding

In Chapter 1, I used the term 'instantiate' when discussing the relationship between, for example, a 1-ary property and the individual that has that property. However, given that abstract individuals cannot have a location in space where ordinary ones can, Zalta will need to similarly

[17] Zalta takes relations to be primitive and takes properties to be 1-place relations. But, for the sake of clarity, it is easier to portray properties as primitive and take relations to be n-ary properties for n>1. I do not believe that I do a disservice to Zalta's metaphysics by taking the notion of a property to be the primitive notion as is more standard.
[18] Taking relations as primitive, properties would be 1-place relations and propositions would be 0-place relations.
[19] *Intensional Logic and the Metaphysics of Intentionality*, 41.
[20] Ibid, 56.

distinguish between the ways that these individuals have properties. For example, imagine a real bear and some fictional bear. Both the real bear and, say, Papa Bear from the tale of Goldilocks can be said to be furry (i.e. have the property of furriness). But, according to Zalta, these two individuals do not have said property in the same way. I could, unwisely, pet a real bear and feel its fur. This is not the case for Papa Bear. I cannot pet him because, as a fictional character, he doesn't and can't occupy space and time. At the same time, Zalta would claim that Papa Bear also has the property of furriness. Zalta will say that the real bear *exemplifies* the property of furriness. This instance of furriness is a feature of a bear that exists in space and time.[21]According to Zalta, if something exemplifies the property of furriness it exists, has a location in spacetime, is made of matter, and so on. Papa Bear does not himself exemplify furriness. But, the property of furriness is somehow involved in the fictional representation of Papa Bear. As such, Zalta would say that Papa Bear *encodes* the property of furriness.[22]

Zalta provides no real definition of encoding. Rather, he uses an example like that of the bears to motivate the distinction. We can say that individuals that have properties but do not exemplify them encode them. But, this is not a satisfying definition. A more helpful distinction might be to point out that ordinary individuals necessarily and always fail to encode their properties.[23] The real bear will never encode the property of furriness or any other property. Abstract individuals do encode some of their properties. When an abstract individual encodes a property, it encodes the property necessarily and always. In addition to the properties it encodes, an abstract individual may exemplify some properties. Cthulhu, to rehash a previous example,

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[21]Ibid 15-16. While this is the case with respect to the exemplification of the property of furriness in particular, the reader should not take this claim as a general claim about the nature of exemplification. For example, being the object of someone's search can be exemplified by things that both exist in space and can never exist in space.
[22]Ibid, 3.
[23] Ibid, 19.

encodes the property of *being a scary monster*, but *exemplifies* the property of *being feared by John*.

Situations, Worlds, and Times

As noted above, Zalta considers propositions to be structured entities that have objects and properties as their parts. When a proposition has an abstract individual as a part, whether that abstract individual encodes or exemplifies the proposition is somehow reflected in the proposition's structure. Additionally, Zalta conceives of propositions as 0-ary properties. For example, since it is true that the Statue of Liberty is made of copper, all individuals exemplify the propositional property of *being such that the Statue of Liberty is made of copper*. In contrast, since it is false that the Statue of Liberty is made of green cheese, no individual exemplifies the propositional property of *being such that the Statue of Liberty is made of green cheese.*

Propositions, according to Zalta, are also grounding entities for situations, worlds, and times. For situations, worlds, and times Zalta claims that "what makes it that world (situation/time) and not some other is defined by the propositions true at that world (situation/time)."[24] Zalta argues that situations, worlds, and times should be thought of as a type of abstract individual rather than as a complex proposition or other n-ary property. First, situations, worlds, and times are not complex propositions given that complex propositions have a value of either true or false. This is not the case for situations, worlds, and times. They are not true or false (at least in the same sense) as propositions. Further, he claims that worlds, situations, and times, unlike propositions, are not assertable. Similarly, they are not the kinds of things we have doxastic attitudes about as we do with propositions. Finally, they are not

[24] Ibid, 61.

predicable of other things as properties are. Thus, they are not properties. By elimination he concludes that it is likely that they are abstract individuals that encode propositions.[25] Situations, worlds, and times are, therefore, best characterized by the propositions (i.e. 0-ary properties) they encode rather than by any properties exemplified. Further, it is more accurate to say that the encoded propositional properties are what distinguish situations, worlds, and times. Propositional properties (i.e. *being such that the Statue of Liberty is made of copper*) are, Zalta claims, ideal for characterizing situations, worlds, and times.[26]

Zalta conceives of situations as abstract individuals that only encode propositions (and no other properties). The propositions a situation encodes are true in that situation. As such, a situation is *actual* when all the propositions it encodes are true. Similarly, we say that a situation is *possible* when it is possible for all the propositions that the situation encodes to be true (this will mean that the set of propositions encoded is logically consistent). Further, some situations are *maximal*. For a situation to be maximal every atomic proposition or its negation must be encoded by the situation. Both worlds and times Zalta identifies as situations. Worlds are maximal, possible situations (and thereby consistent). Times are tense theoretic counterparts to worlds. That is, every time is a maximal temporally consistent situation. To say that a situation is temporally consistent is to say that it is possible for all the propositions it encodes to be simultaneously true.[27]

I would like to take a moment here to summarize and provide a benchmark of where we are metaphysically. There are three metaphysical conclusions that I would like to highlight and keep fresh in the reader's mind. First, the notion of an n-ary property is primitive. Relations are

[25] Ibid, 61-62.
[26] Ibid, 62.
[27] Ibid, 64-65.

taken to be n-ary properties where n≥2 and propositions are taken to be 0-ary properties.[28] Second, properties can either be encoded or exemplified. Third, there are abstract and ordinary individuals. An individual is ordinary if it possibly at some time has a location in space; an individual is abstract if it does not possibly at some time have a location in space. Abstract individuals (and only abstract individuals) encode properties. Both abstract and ordinary individuals can exemplify (at least some) properties. Situations, worlds, and times are abstract individuals that encode propositions and only propositions.

The Rejection of Strong Extensionality

Two more aspects of Zalta's view are required to explain his rejection of Strong Extensionality. First, I will cover the individuation conditions for properties. Then it will be necessary to discuss Zalta's natural semantic theory of truth. Two properties are identical when they are encoded by the same individuals. In other words, for any properties F and G, F=G just in the case that, for all individuals x, x encodes F iff x encodes G. This is not true only for 1-place properties. The definition can be expanded for properties we would normally consider relations. The inverse is also true. Two properties F and G are different when there is at least one individual that encodes one of F or G that does not encode the other.[29]

Further, Zalta opts for a natural semantic conception of truth for atomic sentences (distinct from the metaphysical theory of the truth of atomic propositions presented earlier). An atomic exemplification sentence will involve an n-ary predicate followed by n individual terms. The n terms will denote ordinary or abstract individuals and the n-ary predicate will denote an

[28] Or as Zalta would have it, the primitive notion is of an n-ary relation where properties are 1-ary relations and propositions are 0-ary relations.
[29] *Intensional Logic and the Metaphysics of Intentionality*, 51-52.

n-ary property. For a 1-place predicate denoting a 1-ary property, relative to each time and each world, there will be a set of individuals that exemplify the property denoted. This set is the exemplification extension of the 1-ary property at the relevant world-time pair. Depending on the property denoted, the individual may be ordinary or abstract. The atomic exemplification sentence (in this case involving a 1-place predicate) is true at a world time pair iff the individual denoted by the individual term is a member of the exemplification extension at the world and time of the property denoted. For n≥2 predicates, the predicate will denote an n≥2-ary property (relation). And, relative to each time and world there will be a set of ordered n-tuples of individuals denoted by the n terms that exemplify the n≥2-ary property at that world and time. This is the exemplification extension of the n≥2-ary property. The atomic sentence containing the n≥2-place predicate and n terms will be true at a world time pair just in case the ordered n-tuple of individuals denoted by the n terms is a member of the exemplification extension of the property at the world and time the property is exemplified.[30]

An atomic encoding sentence will involve a 1-place predicate that denotes a 1-ary property preceded by an individual term that denotes an abstract individual. In addition to its exemplification extension, the 1–ary property will have an encoding extension consisting of all and only the abstract individuals that encode it. An atomic encoding sentence is true iff the abstract individual denoted by the individual term is a member of the encoding extension of the 1-ary property denoted. As I have stated, when an abstract individual possibly at some time encodes a property, it necessarily and always encodes that property.[31] As such, encoding extensions are not relativized with respect to worlds and times.[32]

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[30] Ibid, 42-43.
[31] Ibid, 22.
[32] Ibid, 45.

Traditionally, logicians have been concerned with model theoretic semantic conceptions of truth. These do not take properties to be primitive members of the domain. As such, an n-place predicate does not denote a property. On the standard semantics for modal logic, the semantic value of an n-place predicate is a function from worlds to sets of individuals (in the case of a 1-place predicate) or sets of ordered n-tuples (in the case of an n-place predicate). As such, a model theoretic account of truth is strongly extensional. Being an F, where 'F' is a 1-place predicate, is merely being a member of a set that is the value of the relevant function. If the 1-place predicate 'G' has as its semantic value the same function that 'F' does, then being an F is the same thing as being a G.[33] This becomes problematic in cases when the two predicates 'F' and 'G' are, for example, 'married bachelor' and 'brown and colorless dog'. Although the predicates have the same extension (the null set), being a married bachelor is intuitively different from being a brown and colorless dog.

The natural semantic conception, on the other hand, distinguishes properties from their exemplification extensions at worlds. The semantic value of the predicates that denote relevant properties are not identified only with exemplification extensions at worlds. Rather, the properties denoted by terms are considered prior to their exemplification extensions at worlds on the basis of the abstract individuals that encode the properties. In other words, even if 'F' and 'G' have the same exemplification extension at all worlds and times, they denote different properties if they are encoded by different individuals.[34] Recall that for every condition on properties, there is an abstract individual that encodes just those properties. As such, there is an abstract individual that encodes just the property of being a brown and colorless dog and not the property of being a married bachelor. So, these are different properties. Despite both having the

[33] Ibid, 43-44.
[34]Ibid, 44.

null set as their exemplification extension, they are not encoded by all the same abstract individuals.

To conclude, Strong Extensionality purportedly licenses the inference to '*being an F* is the same thing as *being a G*' from 'necessarily, all and only F's are G's'. The problem was that, while such an inference is validated on standard model theoretic modal semantics, there seem to be natural language counterexamples to it. Zalta's natural semantic theory of truth is not strongly extensional and thereby solves the problem.

A Logical Treatment of the Relevant Elements

Thus far, my treatment of Zalta's solution to Strong Extensionality has been based largely in his metaphysics. This is because the solution to that problem was largely based on the metaphysics of properties. However, the things I have discussed can be represented in his logic. I will cover some of this now. It will not only serve as an explanation of the logical representation of Zalta's solution to Strong Extensionality, but it should also serve as a jumping off point for a discussion of his solution to the problem of *Existential Generalization*, which requires more of his logic. In this section, I will cover some syntax and semantics of his logical language and some of the axioms (both logical and non-logical) of his formal system.

To begin with some fundamentals, the foundations of Zalta's logic is a classical, second order modal and temporal logic.[35] Given that the logic is a second order logic, it will have quantifiers ranging over predicate variables in addition to individual variables. With regard to the modal and temporal aspects of the logic, Zalta uses the standard axioms, rules, and symbols of

[35] Additionally, Zalta uses the standard axioms, rules, and symbols of propositional logic and predicate logic.

S5 modal logic and K_t temporal logic. As such, we have (in addition to those of propositional and predicate logic) these operators:

- Necessarily: □
- Possibly: ◊
- Always: ■
- Sometimes: ♦

Zalta's approach to representing the distinction between exemplification and encoding is quite simple. It concerns whether a variable representing a denoting individual term occurs before or after a variable representing a denoting predicate. Where 'Φ'denotes a 1-place predicate and 'α' denotes an ordinary or abstract individual, 'Φα' asserts that the individual denoted by 'α' exemplifies the property denoted by 'Φ'where 'Φ' denotes a 1-place predicate and 'α' denotes an abstract individual, 'αΦ' asserts that the individual denoted by 'α' encodes the property denoted by 'Φ'.[36]

Existence, i.e. the property of having a location in space, is represented in Zalta's system as the one place predicate 'E!'[37] In the formal system, 'E!b' might represent the claim that my dog Benji exists. Furthermore, what that statement means is that Benji has a location in space. Abstract individuals will never be in the exemplification extension of E!. They, by definition, are not located in space. As such, in Zalta's theory it is always false to say that an abstract individual exists. Instead, they are the kinds of things that can never exist (have a location in space). So, while abstract individuals have some kind of being, they cannot be truly said to exist in Zalta's system.[38]

[36] I*ntensional Logic and the Metaphysics of Intentionality*, 19-20.
[37]Ibid, 21.
[38]Ibid, 21.

The properties of being ordinary and being abstract can now be expressed in the language as the 1-place predicates ‘O!’ And ‘A!’.[39] They are defined as follows:

- Being ordinary (O!) =df [λx◊♦E!x]
- Being abstract (A!) =df [λx~◊♦E!x][40]

Translated to the metalanguage, being ordinary is being an individual x such that it is possible at some time for x to exist. Being abstract is translated as being an individual x such that it is *not* possible at some time for x to exist. Of course, ‘exist’ here can be replaced with the phrase ‘has a location in spacetime’.

You will have noticed that Zalta invokes the symbol ‘λ’ in defining the predicates ‘O!’ and ‘A!’. The lambda symbol represents an expression necessary in defining those predicates. Lambda expressions, while not common in classical logics, are more common in intensional logics. Zalta uses them to construct complex terms that denote properties. They have the form [λx Φ]. This is read as ‘being an individual x such that Φ’. It is important to note that, if ‘x’ occurs in ‘Φ’, it is not bound in ‘Φ’. For example, take the sentence ‘Da&Ba’, where ‘D’ denotes the property *being a dog* and ‘B’ denotes the property *being brown*. This sentence represents the claim that the individual denoted by ‘a’ exemplifies both *being a dog* and *being brown.* However, if we wanted to represent the claim that the individual denoted by ‘a’ exemplifies the conjunctive property *being a brown dog* we might use the lambda expression ‘[λxDx&Bx]a’ If we wanted to claim that the individual denoted by ‘a’ *encodes* the property we would write ‘a[λxDx&Bx]’.[41]

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[39] Zalta uses ‘!’ to indicate privileged predicates whose uses are fixed on all interpretations of the language.
[40] *Intensional Logic and the Metaphysics of Intentionality*, 21.
[41] Ibid, 21.

To begin an explanation of Zalta's semantics, an interpretation of the language includes the following:

- the domain **D** that represents the nonempty set of objects, this includes ordinary individuals, abstract individuals, and n-ary properties;
- **W** is the set of possible worlds, where W includes $\mathbf{w}_0$ as the privileged actual world;
- **T** is the set of times, where T includes $\mathbf{t}_0$ as the privileged actual time;
- the exemplification extension specification $\mathbf{ext}_{w,t}$ is a function that maps 1-place predicates denoting unitary properties to the ordinary or abstract individuals that, for each world w and time t, exemplify those properties in world w at time t, and it maps n>1-place predicates denoting n-ary properties onto sets of ordered n-tuples of abstract or ordinary individuals that, for each world w and time t, exemplify those properties in world w at time t;
- An encoding extension specification, $\mathbf{ext}_a$ that maps 1-place predicates denoting unitary properties onto the sets of abstract individuals that encode the property denoted; and
- A naming function **F,** that maps primitive terms (denoting both individuals and n-ary properties) onto members of the domain **D**.[42]

I will now present some of the important definitions and axioms that function in Zalta's logic. I will present them both in plain English and in the formal language. The axioms are as follows:

1. $(\forall x)(O!x \rightarrow \Box \blacksquare \sim(\exists xF)xF)$[43]

Read as "ordinary individuals necessarily and always fail to encode properties".[44]

[42] Ibid, 41-42 & 236.
[43] Ibid, 21.
[44] Ibid, 19.

2. $\Box\blacksquare(\exists x)(A!x \,\&\, (\forall F)(xF \equiv \Phi))$ (where 'Φ' does not contain 'x' free, but may contain 'F' free)[45]

Read as "For any condition on properties Φ, it is necessarily and always the case that there is an abstract individual that encodes just the properties satisfying condition Φ."[46]

3. $(\forall x)(\forall F)(\Diamond\blacklozenge xF \rightarrow \Box\blacksquare xF)$[47]

Read as "If it is possibly or sometimes the case that an individual encodes a property, then that individual encodes that property necessarily and always."[48]

4. $\alpha = \beta \rightarrow (\Phi(\alpha,\alpha) \equiv \Phi(\alpha,\beta))$ (where 'α' and 'β' are variables that both range over individuals and '$\Phi(\alpha,\beta)$' is the result of replacing at least one instance of 'α' in '$\Phi(\alpha,\alpha)$' with 'β')[49]

Read as "If individual α and individual β are identical, then anything true about α is also true about β". [50]

The definitions are as follows:

1. $x = y \equiv_{df} (O!x \,\&\, O!y \,\&\, \Box\blacksquare(\forall F)(Fx \equiv Fy)) \,V\, (A!x \,\&\, A!y \,\&\, \Box\blacksquare(\forall F)(xF \equiv yF))$[51]

Read as "Individuals x and y are identical if and only if one of the following conditions holds: (a) x and y are ordinary individuals and necessarily and always exemplify the same properties, or (b) x and y are abstract individuals and necessarily and always encode the same properties."[52]

2. $F = G \equiv_{df} \Box\blacksquare(\forall x)(xF \equiv xG)$[53]

Read as "Properties F and G are identical just in case it is necessarily and always the case that F and G are encoded by the same individuals."[54]

Returning to Zalta's analysis of Strong Extensionality, the premise that necessarily and always everything that is F is G is represented as '$\Box\blacksquare(\forall x(Fx \equiv Gx))$'. *Being F* is the same as

[45] Ibid, 21.
[46] Ibid, 19.
[47] Ibid, 22.
[48] Ibid, 19.
[49] Ibid, 22.
[50] Ibid, 19.
[51] Ibid, 21.
[52] Ibid, 19.
[53] Ibid, 22.
[54] Ibid. 19.

being G is represented as 'F=G'. Because Zalta individuates properties by the abstract individuals they encode, 'F=G' is equivalent to '□■(∀x(xF≡xG))' (notice the encoding expressions). However, Strong Extensionality licenses the inference from '□■(∀x(Fx≡Gx))' to '□■(∀x(xF≡xG))' (or 'F=G' as they are equivalent). This inference is not valid on Zalta's semantics.

Solving *Existential Generalization*

Recall that *Existential Generalization* is an inferential principle that allows for the derivation of a sentence of the form 'some existing thing is such that it…' from a sentence containing a name or definite description. As noted in Chapter 1, there are instances of this inference that seem to be counterexamples to this inferential principle. For example, from 'John fears Cthulhu' it does not seem valid to infer 'John fears something that exists'.[55] This seeming invalidity is preserved in Zalta's logic. Zalta's metaphysics invokes multiple types of being. Zalta agrees with Quine's dictum that "To be is to be the value of a bound variable." All the objects in the domain of an interpretation are things that can be the values of variable bound with the quantifiers 'Ǝ' and '∀'. On Zalta's logic, all objects in the domain are objects that have some kind of ontological status according to the interpretation. I write 'some kind of ontological status' because as previously discussed the word 'existence' means 'has a location in space' and is represented as 'E!' in the logic rather than 'Ǝ'. The ontological status represented by the quantifiers is a broader category that includes but is not exhausted by objects that exist. When one asserts a sentence of the form 'ƎxΦ' (now read as 'There is an x such that Φ') one is ontologically committed to there being an x even when x does not exist.[56] We would represent

[55] Ibid, 4-5.
[56] Ibid, 21.

‘John fears Cthulhu’ as ‘Fjc’ where ‘F’ denotes the relational property of fearing, ‘j’ represents the ordinary individual John, and ‘c’ represents the abstract individual Cthulhu. Through the existential quantifier introduction rule we might derive ‘∃xFjx’. This, however, does not express that John fears something that exists. It expresses that John fears something. ‘John fears something that exists’ would be represented as ‘∃x(Fjx & E!x)’. This does not follow from ‘Fjc’ and will not be true in the case that ‘c’ denotes an abstract individual. As such, *Existential Generalization* is not a valid inference as one cannot, with Zalta’s logic, infer existence claims solely from sentences in the language such as ‘Fjc’ even if ‘c’ were to denote an existing individual.

However, the inference to, for example, ‘Ponce De Leon searched for something that exists’ from ‘Ponce De Leon searched for the fountain of youth’, while still problematic, requires an additional analysis of definite descriptions to account for the seeming invalidity of the inference. The traditional Russellian treatment of definite descriptions will not work. Were Zalta to adopt a Russellian approach to definite descriptions, we might represent the fountain of youth as ‘∃x(xF&∀y(yF→ x=y))’ where ‘F’ denotes the conjunction of properties that the fountain of youth encodes. While, given principle 2, this is a true sentence in Zalta’s language (and would be false if rewritten with exemplification formulas), the Russellian treatment denotes a proposition rather than the abstract individual that is the fountain of youth.[57]

Recalling that lambda expressions are terms that denote complex properties. Zalta does something similar to create complex terms that denote individuals. These are of the form (ιx)Φ (where Φ can involve both exemplification and encoding formulas). This is read as ‘the x such that Φ’. ‘ι’ represents the logical notion of the word ‘the’. Such a term will rigidly denote the

[57] Ibid, 78.

individual, ordinary or abstract, that actually now uniquely satisfies Φ. If there is no such individual, the term will fail to denote. It is important to note that Zalta insists that "even when they appear inside the scope of modal and tense operators, they will denote the unique object that satisfies the description at the actual world and present moment, should there be such an object."[58] In other words, even when the 'ι' is under the scope of temporal or alethic operators, it will still designate the unique individual (if there is one) that satisfies the conditions Φ at the actual world or present moment.

The proposition that Ponce de Leon is searching for the fountain of youth can now be expressed as 'Sp(ιx)xF'. This sentence is true just in case there is a unique individual that satisfies 'xF' that is the object of Ponce de Leon's search.[59] However, given the analysis of definite descriptions, it is still not a valid move to infer that Ponce de Leon searched for something that exists. While it follows from the fact that Ponce de Leon search for the fountain of youth ('Sp(ιx)xF') that Ponce de Leon searched for something (expressed as 'ƎySpy'), no valid inference will yield 'Ǝy(Spy & (E!y))'.

Closing Matters

To summarize, neither Strong Extensionality nor *Existential Generalization* are valid inferences in Zalta's intensional logic. Further, to address the problems that arise from these inferential patterns, Zalta quantifies over abstract entities and properties thought of as universals. However, while it may be the case in Zalta's logic that to be is to be the value of a bound variable, to exist is not to be the value of a bound variable. While the existential quantifier tracks being, it does not track existence. Existence is represented as the predicate 'E!'. Importantly, one

[58] Ibid*,* 81.
[59]Ibid, 81.

cannot infer a sentence of the form ‘∃x(Φx&E!x)’ from sentences of the form ‘Φα’. Inferences that derive the identity of properties from a premise of the form ‘□■(∀x)(Fx≡Gx)’ are also invalid. Zalta’s metaphysics does not guarantee that merely because two predicates denote properties that have the same extension that those properties are identical. Rather, properties are identified by the individuals that encode them.

Chapter 3: A Nominalistic Approach to *Existential Generalization* and *Strong Extensionality*

Three Axes of Contemporary Nominalist Views

In my discussion on nominalism in Chapter 1,[60] I focused only on the rejection of abstract individuals and universals. In reality, nominalism is more complex than my treatment of it thus far. Here, I would like to discuss various positions a nominalist might take along three axes:

A) the types of objects that are in the world,
B) the cardinality of the world, and
C) the role of existential quantification on ontological commitment.

This will accomplish two things. First, nominalism will get the treatment it is due in terms of diversity and contribution. Second, this discussion will identify the commitments and restrictions necessary of a nominalist metaphysics for an adoption of Zalta's logic. What I write should not be taken as indicating an archetype for the nominalist position. Rather, the positions below are some positions that nominalists may hold regarding the three axes I have listed. Further, this is only a brief discussion of contemporary nominalist views. Nominalism has a long history with roots in the metaphysical philosophy of the Middle Ages.[61] I do not have the space to discuss the history of nominalism or the nominalisms of the Middle Ages here.

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[60] pp. 6-7
[61] Rodriguez-Pereyra, Gonzalo, "Nominalism in Metaphysics", *The Stanford Encyclopedia of Philosophy* (Summer 2019 Edition), Edward N. Zalta (ed.), https://plato.stanford.edu/archives/sum2019/entries/nominalism-metaphysics.

"Steps Towards a Constructive Nominalism"[62] acts as a sort of manifesto for the nominalisms of Nelson Goodman and W.V.O Quine. More importantly, however, two of the three axes with which I am concerned are present in the text. On the types of objects in the world (axis A) they write, "No one supposes that abstract entities… exist in space-time; but we mean more than this. We renounce them altogether."[63] So, even in the sense of Zaltian abstract individuals that cannot be said to exist and do not and will never exist in space-time, nominalists such as Goodman and Quine will reject their being in any sense. In a separate piece outlining the *differences* between the nominalisms of the two, Goodman posits that Quine's nominalism can countenance classes of individuals. Goodman adds, however, that for him, "nominalism could countenance no classes but only individuals."[64] Here we can see that regarding axis A, a nominalist might hold a strict view that rejects all abstract entities, both particular and universal. But, like Quine, a nominalist might be more permissive and countenance sets (or classes) thought of as abstract particulars. It is important to note, however, that what *is* essential for the nominalist on axis A is a rejection of properties thought of as universals and a rejection of abstract individuals (with possible exceptions for classes/sets). Further, Goodman and Quine explicitly renounce infinite cardinalities.[65] They are in favor of assuming that there are merely a finite number of things.[66] A nominalist need not take this extreme view, however. A view that is more permissive of infinite cardinalities is not necessarily antithetical to nominalism. Third, on the extreme end of axis C, we have the Quinean Dictum: "to be is to be the value of a bound

[62] Goodman, Nelson, and W. V.O. Quine. "Steps toward a Constructive Nominalism." *Journal of Symbolic Logic* 12, no. 4 (December 1947): 105–22. https://doi.org/10.2307/2266485.
[63] Ibid, 105.
[64] Goodman, Nelson. "Nominalisms." Essay. In *The Philosophy of W.V. Quine*, edited by Lewis Edwin Hahn and Paul Arthur Schlipp, 159–64. Open Court, 1998.
[65] Quine was a finitist at the time of writing. He might not have retained his finitism later into his career.
[66] "Steps Toward a Constructive Nominalism", 106.

variable." There is, according to Quine, only one kind of ontological status. Furthermore, that status is tracked by the existential quantifier. As such, ontological *commitment* is tracked by one's use of the existential quantifier. In other words, anything and everything denoted by a variable bound by an existential quantifier will be in the domain of objects and said to exist. As we will see later in this chapter, however, a nominalist may take a more moderate approach to existential quantification and ontological status.

The extremist along axis A will reject almost *all* of Zalta's ontological posits. Mathematical objects, such as numbers and sets, are often thought of as abstract particulars or, in the parlance of Zalta, abstract individuals, by those who think they are real. possible worlds are abstract. Zalta asserts that propositions are abstract. Additionally, propositions are essential to both worlds and times on his view.[67] As such, the extreme nominalist along axis A will want to reject Zalta's claim that propositions, worlds, and times have ontological status. And, as is required of the nominalist generally, the extreme nominalist will also reject properties and relations thought of as universals. So, it would seem that moderation with respect to axis A is necessary for the adoption of Zalta's logic. I will show later in this chapter that this is not necessarily the case. I will argue that moderation with respect to axis C can compensate for an extreme position on axis A. This is because moderation along the C axis will allow for quantification over things such as properties thought of as universals and abstract individuals without any ontological commitment to those individuals. As such, the nominalist can maintain that certain entities postulated by Zalta have no ontological status despite existentially quantifying over them. Even if a nominalist were moderate with respect to axis A, Zalta's solution to *Existential Generalization* will require quantification over abstract individuals. An

[67] *Intensional Logic and the Metaphysics of Intentionality*, 61.

ontological commitment to abstract individuals of the sort required for Zalta's solution to *Existential Generalization* would entail more so an abandonment of nominalism than any sort of moderation with respect to axis A. So, it seems as though moderation along axis C is still required. As for axis B, either a moderate or extreme stance could be taken by the nominalist. It is not clear to me that a nominalist would need to quantify over an infinite number of objects to adopt Zalta's treatments of *Existential Generalization* and Strong Extensionality.

Azzouni's Moderate Nominalism

Jody Azzouni, in *Deflating Existential Consequence*,[68] is a somewhat idiosyncratic nominalist who rejects the Quinean dictum. As such, he is moderate with respect to the C axis which allows him to quantify over (and even claim that there are) many of Zalta's postulated entities, while rejecting any ontological commitment to them. So, he is a hopeful candidate for a nominalist adoption of Zalta's system. In this section, I will present the details of Azzouni's view and characterize it with respect to the framework above. To begin, Azzouni's aim in *Deflating Existential Consequence*, is to preserve truths in classical mathematics while rejecting ontological commitment to mathematical entities. Azzouni, as far as I am aware, does not commit himself to finitism. This is not to say that he maintains that there are an infinite number of objects. Rather, his project in *Deflating Existential Consequence* is not concerned with whether or not there are an infinite number of objects. To my knowledge, nothing he writes precludes a moderate stance along axis B.[69] What's more, given that classical mathematics postulates an infinite cardinality of entities, it is reasonable to assume Azzouni *would* take a moderate stance with respect to axis B. Given his project, it is clear Azzouni takes an extreme

[68] Azzouni, Jody. *Deflating Existential Consequence a Case for Nominalism.* New York, NY: Oxford University Press, 2004.
[69] Ibid, 4.

position along the A axis. In other words, Azzouni posits only non-abstract particulars.[70] And, while his project in *Deflating Existential Consequence* is primarily concerned with the ontological rejection of mathematical entities, he does address properties. As mentioned earlier, it is essential for a nominalist to reject properties (thought of as universals) and abstract individuals generally (with the possible exceptions for classes). Azzouni takes properties thought of as universals to have no ontological status at all. Further, his approach to preserving mathematical truths while ontologically rejecting mathematical entities also applies to truths concerning sentences about properties[71]. In addition, Azzouni explicitly talks about fictional objects, which he claims exist in "no sense at all." They, like hallucinations and dreams, are completely made up.[72] To summarize, Azzouni takes an extreme position with respect to the A axis and a seemingly neutral position with respect to axis B. In the following section, I will outline his moderacy along the C axis.

Azzouni's Rejection of the Quinean Dictum

Quine takes the dictum (to be is to be the value of a bound variable) to be *trivially* true. That is to say that he takes the phrase 'there is' to carry ontological commitment in natural language. Additionally, in classical first-order logics at least, 'there is' is represented as the existential quantifier. So, a use of the existential quantifier would seem to commit us to the things it ranges over. However, according to Azzouni, this is harder to establish than Quine maintains. In chapter 3 of his book *Deflating Existential Consequence: A Case for Nominalism,* Azzouni presents his argument for rejection of the Quinean dictum. He claims that "[i]t's a substantial claim to assert that the ordinary language idiom 'there is' conveys ontological

[70] Ibid, 4-5.
[71] Ibid, 106-108.
[72] Ibid, 61-62.

commitment."[73] To demonstrate, Azzouni appeals to ordinary uses of natural language. Take, for example, Mickey Mouse. If someone were to survey native, fluent speakers of English and ask "Is there a talking mouse named 'Mickey' who owns a dog named 'Pluto'?" the speakers would most likely respond with something like "there is." But, were the English speakers asked whether Mickey Mouse *exists* they might reply "No. Mickey Mouse does not exist. He is a fictional character." Azzouni, as a result, maintains that there are uses of the English phrase 'there is' in natural (English) language that are not ontologically committing.[74] So, Azzouni claims that '∃x(x is named 'Mickey' & x owns a dog named 'Pluto')' does not imply the existence of x.

Azzouni and Ontological Commitment

In rejecting the Quinean dictum, Azzouni does provide an existence predicate that indicates ontological commitment, in lieu of tracking ontological commitment with the existential quantifier. His criteria for satisfying the existence predicate is ontological independence of any linguistic or psychological process."[75,76] Psychological dependence, according to Azzouni, is a difficult notion to describe. He points out that in cases of fiction or hallucination entities are made up or stipulated by the author or hallucinator.[77] It is clear in these cases that the entities are psychologically dependent, and as such, Azzouni will deny that they

[73] Ibid, 53.
[74] Ibid, 115-116.
[75] *Deflating Existential Consequence*, 92.
[76] He considers three other criteria for what exists. However, he claims that the motivations for choosing these other three lie in epistemology instead of metaphysics..
[77] The reader might notice here that there is a difference between fictions and hallucinations. A fiction is purely stipulated by an author. This is not the case with hallucinations. Nonetheless Azzouni will want to claim that both are still dependent on linguistic and psychological processes.

exist.[78] On the other hand, Azzouni will take things like individual frogs to exist as they are non-abstract particulars.[79]

To fully understand Azzouni's theory of ontological commitment requires an understanding of what he calls 'posits'. Posits, as described by Azzouni are "the purported referents of singular terms (names and definite descriptions) wherever such terms arise in our discourse: ordinary discourse, in the sciences, in mathematics, discourse about fiction, and so on."[80] In other words, posits are the putative things that names and definite descriptions purportedly pick out. For example, the thing that the name 'Nicolas Cage' picks out is the actor Nicolas Cage. As such the posit corresponding to the name 'Nicolas Cage' is Nicolas Cage himself. And, when we utter the sentence 'Two is the only even prime number', the name 'two' is used to indicate a number. So, the corresponding posit for the name 'two' is the number two. Azzouni, as I have explained, does not take numbers to exist. He would, presumably, take the actor Nicolas Cage to exist. I want to stress, then, that Azzouni maintains that there is a posit corresponding to *every* meaningful phrase, even if the posit does not exist on Azzouni's view.

Azzouni distinguishes between three different kinds of posits: ultrathin, thin, and thick. The distinguishing factor between kinds of posits on this view is the extent to which they satisfy an epistemic burden. First, there are thick posits. These meet the criteria for existence as laid out by Azzouni. Thick posits satisfy the maximal epistemic burden of "thick epistemic access." We have thick epistemic access to something when an individual or group of people can sense the

[78] *Deflating Existential Consequence*, 92-93.
[79] This differs a little bit from Zalta's notion of an ordinary object in that Zalta's notion is seemingly possibilist. I am not sure the extent to which Azzouni is comfortable carrying an ontological commitment to possibly at some time existing objects. Possibilism is not one of the axes I identified earlier in this chapter.
[80] *Deflating Existential Consequence*, 125.

object with their human sensory faculties, with the aid of instruments such as a microscope, or via a complicated network of instruments, sensory faculties, computers, etc. Azzouni places four conditions on thick epistemic access:[81]

1. Robustness: The results of thick epistemic access to something are largely independent (epistemically speaking) of what the recipient(s) expects from that access.
2. Refinement: There are means of adjusting and refining thick epistemic access to the things being detected.
3. Monitoring: Thick epistemic access to things enables tracking of them (either in the sense of detecting what they do over time or in the sense of taking time to explore different aspects of them).
4. Grounding: (Certain) Properties of the objects can be used to explain how the kind of thick epistemic access we have to them enables the discovery of (possibly other) properties of those objects.[82]

For example, given these criteria we would take ourselves to have thick epistemic access to individual frogs. Obviously, we can taste, touch, see, hear, and smell frogs. The touch, taste, smell, etc. of a particular frog is, in fact, independent of what we might have expected our sensory experiences of the frog to be. We can be wrong about what we see when we see a frog. Or, we can be trained to see something when looking at a frog that an ordinary observer might not see. As such, the frog meets the bar of robustness. We might also use a microscope to better observe, e.g., the cellular structure of frogs. So, individual frogs meet the condition of refinement. Third, we might use sensory faculties to monitor the migratory patterns of frogs. As for grounding, let us imagine a scientist who quite enjoys tasting frogs. In one taste test, the scientist tastes a Sonoran Desert frog and subsequently has an intense psychedelic experience. This sort of epistemic access enables the scientist to uncover that the Sonoran Desert frog is venomous. Then, the scientist might go on to discover additional chemical properties of the

[81] Ibid, 129.
[82] Ibid, 129.

frog's venom. Thus, individual frogs (at least of the Sonoran Desert variety) meet the condition of grounding. As may be clear from this example, as our evidence changes, the degree to which a posit will satisfy the epistemic burden required by thick posits will change.[83]

Thin posits have to satisfy two epistemic burdens. First, Azzouni highlights five theoretic virtues: simplicity, familiarity, scope, fecundity, and success. When a theory that exemplifies these virtues posits individuals and collections of individuals to which we lack thick epistemic access, they may be candidates for counting as thin posits in virtue of paying what Azzouni calls 'Quinean rent'. Further, there must be an explanation for why we lack *thick* epistemic access to the entities posited. The idea is that we have theories that make reference to *thick* posits. For example, herpetology makes reference to individuals that fall under the predicate 'frog'. Moreover, herpetology exhibits virtues such that it is epistemically reasonable to accept as a biological theory. As such, Azzouni is claiming that the predicate 'frog' may extend to entities to which we lack thick epistemic access. Azzouni gives the example of a frog that has never been detected by human sight or instrumentation. Obviously, we do not have thick epistemic access to this frog because no one has witnessed it in any way. That there may be such unobserved frogs is consistent with herpetology and any such unobserved frog is a *thin* posit. Azzouni takes thin posits to exist. This is to say that they, too, are ontologically independent of human linguistic activity or psychological processes. However, were a theory to be supplanted by a new more virtuous theory with different posits, the posits of the old theory that are not posits of the new theory would cease to pay Quinean rent and would no longer be taken to exist.[84]

[83] Ibid, 127.
[84] Ibid, 128-129.

When posits fail to pay Quinean rent and/or there is no explanation for why we would lack thick epistemic access to them, they are taken to be ultrathin posits. As examples of ultrathin posits, Azzouni points to the posits of pure mathematics where, as he puts it, "sheer postulation reigns."[85] Fictional objects, like the posits of pure mathematics, are classified as ultrathin posits. When, say, Ponce De Leon searches for the fountain of youth, he is searching for the purported referent of 'the fountain of youth'. But, despite his belief that such a fountain exists, the fountain of youth is a purely fictional entity. The fountain of youth is a posit that is ontologically dependent on human storytelling, imagining, etc. about a fountain with certain characteristics. Such posits exist in no sense at all, according to Azzouni. As such, we are not ontologically committed to them.[86] We do, however, have what Azzouni calls *quantifier* commitment to all of the posits in a theory or work of fiction. That is to say that we can still quantify over all of our posits (and use the English phrase 'there is' to speak about them), including ultrathin posits, in a quantified logic. However, that quantification does not inherently carry ontological commitment. Here I would like to remind the reader that Zalta *does* adhere to the Quinean dictum. This is not to say that Zalta maintains that everything under the existential quantifier exists in his technical sense of the term which entails having a spatiotemporal location. Zalta would claim that fictional objects or mathematical abstracta do not really *exist* on his view. Rather, they have another kind of being as abstract individuals or as fictions originating from authors.[87] Azzouni ultimately rejects this view on the grounds that nonexistent objects are made up. They do not have being at all. This disagreement between Zalta and Azzouni should not jeopardize an Azzounian interpretation of Zalta's semantics. In fact, it should be quite helpful to eliminate or reduce some of the pesky entities that Zalta includes in his ontology, as Azzouni can happily quantify over

[85] Ibid, 127.
[86] Ibid, 128-129.
[87] *Intensional Logic and the Metaphysics of Intentionality*, 21.

abstract individuals (including numbers, worlds, and times), properties, and ordinary individuals in the object language without much worry as to what he is ontologically committed to.

I would also like to note some differences between Azzouni and Zalta's existence predicates. Azzouni's existence predicate is represented as '**E**'.[88] As previously stated, existence can only be correctly predicated of things that exist independently of anyone's linguistic or psychological processes.[89] This differs from having a location in spacetime, although Azzouni might claim that all things that are ontologically independent are located in spacetime. Although Azzouni and Zalta both make use of existence predicates, I would submit that the predicates serve two separate functions. In Zalta's case, the existence predicate serves to delineate between objects that exist and objects that have some other kind of being. Azzouni's existence predicate can be predicated of everything that has any sort of ontological status. Both Azzouni and Zalta, however, allow true statements to be made about the posits of classical mathematics, fictional entities, and properties.

Azzounian Nominalism Approaches to *Existential Generalization* and *Strong Extensionality*

I can now provide a simple Azzounian adoption of Zalta's solution to *Existential Generalization* and two nominalistic approaches to Strong Extensionality. Given that both philosophers make use of an existence predicate *and* Azzouni rejects that the existential quantifier tracks any kind of ontological status, Azzouni should have no problem quantifying over the elements of the domain that solve the problem cases of *Existential Generalization*. Sure, Azzouni will have to *quantify* over abstract objects. But this, on Azzouni's theory, is not

[88] *Deflating Existential Consequence*, 89.
[89] Ibid, 112.

ontological commitment. Azzouni, like Zalta, would agree that 'Ponce De Leon searched for the fountain of youth' is a true sentence. And he, thereby, accepts the fountain of youth as a member of the domain of quantification and accepts a quantifier commitment to the fountain of youth. But, Azzouni will maintain that the fountain of youth exists in no sense at all; it has no ontological status. In Azzouni's language, then, a variable denoting the fountain of youth will not satisfy the existence predicate. As such, while it is true that Ponce De Leon searched for something, it is false that Ponce De Leon searched for something that exists. The only real difference is that Azzouni will maintain that the fountain of youth and other such objects "exist in no sense" whereas Zalta will attribute some sort of being to them.

As for nominalist adoptions of Zalta's solution to Strong Extensionality, Azzounian nominalism provides a simple solution. Clearly, the Azzounian nominalist will have to quantify over properties to use Zalta's logic. However, Azzouni rejects the idea that quantifier commitment entails ontological commitment. So, Azzouni can quantify over properties thought of as universals while denying that they have any sort of ontological status. The Azzounian nominalist who recognizes some value in Zalta's system might want to preserve his solution. As such, the Azzounian nominalist can embrace properties as universals as the Azzounian nominalist will require a mere quantifier commitment to properties. This will allow for a rejection of the principle of Strong Extensionality. In other words, Azzouni's nominalism allows for a mere quantifier acceptance of properties as universals (without ontological commitment) such that those properties are included in the domain prior to considering their exemplification extensions. The Azzounian will need to further appeal to Zalta's principle that, for every condition on properties, there is an abstract individual that encodes those properties. These abstract individuals will also be taken as ultrathin posits. Then the Azzounian nominalist may

appeal to the encoding extensions of properties without any extra ontological commitments. As such, Zalta's general solution to the problem of Strong Extensionality is preserved.

The second nominalist adoption is for the nominalist who might be more moderate along the A axis than Azzouni is. The solution involves a trope theory of properties. Trope theorists take properties to be sets of individual tropes. Tropes are individual features of individual objects. Some tropes are similar to one another. As such, membership in a set of tropes that is a property is determined by similarity. An example from Donald Williams' piece "Elements of Being I" is helpful here.[90] Imagine two lollipops. One has a round, red, lollipop head that has been placed on a stick by a candymaker. The other has a square, red lollipop head placed on a stick qualitatively identical to the stick of the first. I will call the first lollipop 'Circley' and the second 'Squarey'. What Williams is claiming is that the features of the lollipops I have described are *particular* shapes, colors, sticks, etc. And, we might group these particulars together based on a perceived similarity. Circley and Squarey both have individual color features that one might find similar. So, because both Circley and Squarey have individual and distinct but similar color features, we might group those features into, what we might call, a color similarity class. The word 'red', then, will denote the set of tropes that are similar with respect to the color features of Circley and Squarey. To say that Circley and Squarey both exemplify the property of redness is just to say that they each have a trope that is a member of this color similarity set. So, while we would be ontologically committed to these sets on this solution, this does not pose a prima facie problem as they are the kind of thing to which a nominalist who is moderate along the A axis will be willing to ontologically commit.

[90] Williams, Donald C. "On the Elements of Being: I." *The Review of Metaphysics* 7, no. 1 (1953): 3–18. http://www.jstor.org/stable/20123348.

Prima facie, it does not seem as though a trope theorist can solve the problem of strong extensionality given that sets on this view are extensionally defined. In other words, it seems as though we cannot individuate these sets of particular tropes before we consider the particular tropes. Necessarily, if we take properties to be sets of tropes, the sets are extensionally defined. That is to say that two properties are identical, on this view, if they have the same extensions. This does not, however, create a problem for the nominalist who wishes to take this route. The trope theorist nominalist will point out that some problems only seem to arise with the principle of Strong Extensionality with respect to properties that have necessarily null extensions. On a trope theory of properties, there are *no* properties with null extensions. This is because, on a trope theory, properties are sets with at least two tropes grouped by similarity. As such, the trope theorist can happily accept Strong extensionality in this case as there are no issues that arise. Where there might seem to be problems with this solution, however, is where properties have non-null extensions. All creatures with hearts have kidneys and vice versa. As such, *being a creature with a heart* and *being a creature with a kidney* have the same extension. However, I would submit that the trope theorist can individuate these properties too. We might say that *being a heart* and *being a kidney* are different properties. This is to say that they are different sets of tropes. As such, perhaps we can distinguish the properties of *being a creature with a heart* and *being a creature with a kidney* using these two properties that *do* have different extensions. The idea would be that some creature is a member of the set that is the property of *being a creature with a heart* in virtue of having a heart trope. This same creature is also a member of the set that is the property of *being a creature with a kidney* in virtue of the fact that the creature has a kidney trope. Thus, despite the co-extensionality of the set of creatures with a heart and the set of

creatures with a kidney, we can differentiate them by virtue of distinction between the set of hearts and the set of kidneys.

To conclude, the Azzounian nominalist who is moderate with respect to axis C and rejects the Quinean dictum can adopt Zalta's rejection of both Strong Extensionality and *Existential Generalization.* The nominalist who is moderate along axis A and does not reject the Quinean dictum might adopt a trope theory of properties has a plausible solution to the putative problems of Strong Extensionality. However, unless the nominalist who is moderate with respect to axis A is willing to moderate along axis C, there will be no solution to the putative problems of *Existential Generalization*.

Chapter 4: Fregean Senses and Zalta's Solutions to the Problem Instances of Existential Generalization and Substitutivity

Substitutivity and Existential Generalization

There are two more principles for which Zalta seeks to represent or explain their failures. I will present both here. The first is what he calls 'Existential Generalization' (notice the lack of italics). This is a principle related to *Existential Generalization*. It states that, from a sentence containing a name or definite description, it is valid to infer a sentence where 'something' replaces the name or definite description. For example, from the sentence 'Ronald Reagan married Nancy Reagan' it is seemingly valid to infer 'Something married Nancy Reagan. This is a case where a sentence that licenses a conclusion via *Existential Generalization*[91] also licenses a conclusion via Existential Generalization. Further, the seemingly problematic instances of *Existential Generalization* do not constitute counterexamples to Existential Generalization. For example, it does not seem nearly as controversial to infer 'Ponce De Leon searched for something' from 'Ponce De Leon searched for the fountain of youth'.[92] There do, however, seem to be prima facie counterexamples to Existential Generalization. For example, it is a valid use of the principle to derive 'something is such that Ralph believes it to be a spy' from 'Ralph believes that the tallest spy is a spy'. What are we to make of this when Ralph has no clue who the tallest

[91] I want to remind the reader here that *Existential Generalization* licenses the inference 'Something *that exists* married Ronald Reagan' from 'Ronald Reagan married Nancy Reagan.'
[92] It *does*, however, seem problematic to infer 'Ponce De Leon searched for something that exists' as is licensed by *Existential Generalization.*

spy is? We cannot validly conclude from Ralph's completely trivial belief that the tallest spy is a spy that he knows some particular person to be a spy.[93]

The fourth and final problematic principle discussed by Zalta is the principle of Substitutivity. The principle represents the intuition that for any x and any y, if x=y, then anything that is true about x will be true about y. So, from a sentence containing a name or definite description 'D' and a sentence of the form 'D is identical to D*' where 'D*' is a different expression from 'D', we may infer a sentence that differs from the original only in that D* replaces D. This does have valid instances. For example, from 'Mark Twain wrote *Huckleberry Finn*' and 'Mark Twain is Samuel Clemens' we may infer 'Samuel Clemens wrote *Huckleberry Finn*'. However, Zalta points to two examples such that there seems to be a problem with the inference. Given the truth of 'Mary believes that Mark Twain wrote *Huckleberry Finn*' and 'Mark Twain is Samuel Clemens' it might not be the case that 'Mary believes that Samuel Clemens wrote *Huckleberry Finn*' is true. Further, from 'It is necessary that the teacher of Aristotle is a teacher' and 'The teacher of Aristotle is Plato' there is at least one reading of 'It is necessary that Plato is a teacher' on which that sentence is false. Plato might have merely been a stone mason or something of the sort. Notice that the problems occur when modalities or intensional[94] contexts (necessity and belief) are involved.[95]

Senses

Zalta expands his metaphysics considerably to provide solutions to these two puzzles. He identifies a range of entities in his metaphysics suitable to play the role of Fregean senses in

[93] *Intensional Logic and the Metaphysics of Intentionality*, 4-5.
[94] Henceforth, I will use the term 'oblique contexts' to refer to contexts that are modal or intensional.
[95] *Intensional Logic and the Metaphysics of Intentionality*, 5-6.

order to account for the fact that sentences such as 'Mark Twain is Samuel Clemens' can be informative. Frege maintains that, while 'Samuel Clemens' and 'Mark Twain' denote the same person, the two names have different senses. Zalta, borrowing from Frege, describes a sense as the mode of presentation of an object, where one and the same object can be presented in different ways. On a Fregean view, there is a relatively simplistic solution to the problems of Substitutivity. When a name or definite description such as 'Samuel Clemens' falls within an oblique context, the name denotes a sense rather than its ordinary referent. Since distinct but co-referential terms may have distinct senses, distinct terms that denote the same thing in non-oblique contexts might *not* denote the same thing in an oblique context.[96] So, outside an oblique context e.g. 'Samuel Clemens wrote *Huckleberry Finn*', 'Samuel Clemens' denotes the entity variously called 'Mark Twain' or 'Samuel Clemens'. However, let us assume that Mary does not know that Mark Twain is Samuel Clemens. In this case 'Samuel Clemens' in 'Mary believes that Samuel Clemens wrote *Huckleberry Finn*' occurs in an oblique context. So, 'Samuel Clemens' denotes the sense that Mary associates with the term. Since Mary does not know that Samuel Clemens is Mark Twain, 'Mary believes that Samuel Clemens wrote *Huckleberry Finn*' is false. The inference of 'Mary believes that Samuel Clemens wrote *Huckleberry Finn*' from 'Mary believes that Mark Twain wrote *Huckleberry Finn*' and 'Mark Twain is Samuel Clemens' is blocked. This is because 'Samuel Clemens' denotes something different in 'Mark Twain is Samuel Clemens' than it does in the conclusion about Mary's belief. As such, the case doesn't constitute a counterexample to Substitutivity. Frege maintains that because the fact that, in non-oblique contexts, 'D' and 'D*' are coreferential does not entail that they are coreferential in oblique contexts. Substitutivity, then, only allows for the substitution of coreferential terms if they are coreferential in the context of the situation in which they are

[96] Ibid, 153.

substituted. Similarly, Zalta will claim to have preserved as valid all genuine instances of Substitutivity. In the case of Mary's beliefs, the inference is not valid, because it is not a genuine instance of Substitutivity.

Positing things that play the roles of senses is controversial. Many philosophers have argued, convincingly according to Zalta, that denoting terms always *directly* denote. That is to say that some believe that there are no other entities that play a role in securing the denotation of a denoting term. Zalta acknowledges this but believes that postulating some entity that can play the role of Fregean senses will prove sufficiently useful to warrant positing such entities. I want to point out here that Zalta does not maintain that terms *never* directly denote. Rather, there is sometimes an entity that plays the role of Fregean senses and that just is the denotation of a term in oblique contexts.[97]

This is not the entirety of the solution, however. While Frege never adopted a *theory* of senses, Zalta looks to two theories of senses developed respectively by Burge[98] and Salmon[99] to uncover the roles senses play and what kinds of things senses are. I must note here that Salmon's theory of the roles of senses is largely based on Burge's. I do not have the time to discuss each theory in depth here, nor is it necessary to do so. However, presenting what Burge sees as the roles of senses should suffice, as the two theories are similar enough for my purposes here. Burge lists the roles of senses as:

> **Sense$_1$:** The mode of representation to the thinker which is associated with an expression. **Sense$_1$** accounts for the information value associated by a speaker with an expression.
> **Sense$_2$:** That which determines the reference or denotations associated with an expression; for singular terms, senses serve as "routes" to singling out the unique object, if any, denoted by the term.

[97] Ibid, 153-154.
[98] Burge, Tyler. "Belief de Re." *The Journal of Philosophy* 74, no. 6 (June 1977): 338.
[99] Salmon, Nathan. *Reference and Essence*. Princeton: Princeton University Press, 1981.

Sense$_3$: The entity denoted by the term in oblique contexts.[100]

Sense$_1$ is fairly intelligible as is. There is a mode of representation of the object denoted by the expression that some thinking person associates with the expression. I hope that an example will better clarify the idea of a mode of representation. Imagine that Mary is a young girl and has just pulled *Huckleberry Finn* off the bookshelf in her parents' reading room. As Mary begins reading this book. She notices it is written by Mark Twain. Reading further into the book, Mary begins to associate certain properties with Twain. She notices that Twain is funny, mustachioed (she notices this due to a picture of Twain on the front of the book), and a published author. Mary is beginning to form a representation of Twain from the information presented in *Huckleberry Finn*. Mary's **Sense$_1$** of the term 'Mark Twain' is the certain *way* or *mode* that Twain himself is represented to Mary. Note that modes of representation are agent specific. Suppose that Mary has an older brother, John, who is an undergraduate student of literature. John might read the same copy of *Huckleberry Finn* and have a different mode of representation associated with the name 'Mark Twain'. For example, due to his studies, he might understand Twain as having the property of *being the father of American literature* and *being one and the same as Samuel Clemens*. So, John's **Sense$_1$** of the term 'Mark Twain' is the certain *way* or *mode* that Twain himself is represented to John. On Zalta's view, abstract individuals play the role of **Sense$_1$**. Zalta maintains that there is an abstract individual for every condition on properties. So, on Zalta's metaphysic, there will be an abstract individual that encodes all and only the properties that Mary associates with the referent of the name 'Mark Twain'. There is, further, a distinct abstract individual that encodes all and only the properties that John associates with the

[100] *Intentional Logic and the Metaphysics of Intentionality*, 154-155.

referent of the name ‘Mark Twain’. Zalta’s metaphysic is already well situated to provide entities that can play the role of **Sense$_1$**.

The abstract individual playing the **Sense$_1$** roll for the term ‘the writer of *Huckleberry Finn*’ will encode the property of *being named* ‘*Samuel Clemens’* for John but not for Mary. However, for any ordinary English speaker, the abstract individual playing the role of **Sense$_1$** for the term ‘the writer of *Huckleberry Finn*’ will encode the property of *being the author of Huckleberry Finn*. The abstract individual that encodes all and only the property of *being the author of Huckleberry Finn* is suitable to play the role of **Sense$_2$**. It is here I want to introduce the notion of an individuating concept. Zalta thinks of individuating concepts in terms of encoding and exemplifying. In Zalta’s system, an abstract object plays the individuating concept role of **Sense$_2$** iff necessarily and always only one ordinary object exemplifies every property encoded by that abstract object. Samuel Clemens and only Samuel Clemens exemplifies the property of *being the writer of Huckleberry Finn*. Since, for every condition on properties, there is an abstract individual that encodes those properties, there is an abstract object that encodes the property of *being the writer of Huckleberry Finn*. As such, the abstract individual that encodes the property of *being the writer Huckleberry Finn* determines that Samuel Clemens is the referent or denotation of ‘the writer of *Huckleberry Finn*’.[101] However, the abstract individual that plays the **Sense$_1$** roll of a proper name for a given ordinary English speaker will not always encode a set of properties such that all and only those properties satisfy the conditions for being an individuating concept. In this case, Zalta seems sympathetic to a direct reference or causal approach. An ordinary individual, in the case of a causal approach, will have its referent or denotation secured by virtue of exemplifying the property *being the unique thing dubbed* ‘*n*’. While Zalta’s metaphysic guarantees an abstract individual that will encode all and only the

[101]Ibid, 164-165.

property of *being the unique thing dubbed 'n'*, that abstract individual has no role in securing the referent of 'n'.

The **Sense$_2$** of a term is an object that determines its referent in ordinary, non-oblique contexts. By contrast, the **Sense$_3$** of a term is an object that is the referent of the term in oblique contexts. In non-oblique contexts, the proper name 'Mark Twain' refers to an ordinary individual (either in virtue of the fact that that individual exemplifies the properties encoded by the abstract individual that is the Sense2 of the name or (more plausibly) in virtue of a dubbing ceremony that took place circa 1863). However, in the case involving the sentence 'Mary believes that Mark Twain wrote *Huckleberry Finn*', the context is oblique. As such, the **Sense$_3$** of 'Mark Twain' in this sentence, would be the abstract individual that encodes all and only the properties that Mary associates with the referent of the term 'Mark Twain' rather than the ordinary individual that is the referent of the name in non-oblique contexts.

My examples, thus far, have only concerned terms that refer to individuals. But, a term that refers to a property will also have a **Sense$_1$** and **Sense$_3$**. The **Sense$_1$** of a term denoting a property will be the mode of presentation of the properties denoted. Zalta gives the example of the terms 'being a woodchuck' and 'being a groundhog'. In non-oblique contexts, these terms denote the same property. However, some person, say Kate, might learn these terms in different contexts without knowing that they denote the same property. Say, for example, Kate hears her grandparents complain about how the woodchucks on their property ate all of the tomatoes in the garden. Further, she heard a lecture on groundhogs in a biology class. As such, Kate will falsely associate the terms 'being a woodchuck' and 'being a groundhog' with different properties. So, although *being a woodchuck* just is *being a groundhog* Kate does not know this because it is not entailed by the respective senses of the terms. An abstract *individual* cannot play the role of the

Sense$_1$ of a term that denotes a property given that abstract individuals encode the first-order properties possessed by individuals rather than the higher-order properties possessed by properties. As such, Zalta needs abstract entities that can account for cases such as this. It is here that Zalta expands his metaphysics drastically by including the more general notion of an abstract *object*. Up to this point in the thesis I have exclusively used the term 'abstract individual' to speak of abstract things. The term 'abstract object' casts a much wider net. 'Abstract object' is a term that covers the whole class of abstract things. Zalta posits not only abstract individuals, but also abstract n-ary properties.[102] Abstract individuals, Zalta claims, can play some of the roles of Fregean senses. Senses of individual names are abstract individuals, as there will be an object that encodes just the properties associated by a given speaker with the name (in the case of **Sense$_1$** or **Sense$_3$**) or characteristic of the individual actually denoted (in the case of **Sense$_2$**). However, a term that denotes an n-ary property will also require an entity suitable to play the role of a Fregean sense. In this case, there must be an abstract *object* that encodes the higher-order properties that can be exemplified by n-ary properties as opposed to the properties of individuals. As such, there are now abstract entities suited to play the roles of the distinct modes of presentation of the property, *being a groundhog*, that are the respective **Sense$_1$** of the terms 'being a groundhog' and 'being a woodchuck' for Kate. Further, there are respective **Sense$_3$** of these terms in oblique contexts involving Kate. [103]

On its face, merely adding abstract n-ary properties does not seem like a radical expansion of Zalta's metaphysics. But, there must be abstract objects that play the roles of senses with regard to terms denoting these abstract n-ary properties too. And, for those abstract objects there must also be abstract objects playing the roles of senses for terms denoting them. Indeed,

[102] Ibid, 15.
[103]Ibid, 161-162.

there are things that play the roles of senses in increasing order *ad infinitum*. Zalta's metaphysics includes a type theory such that there are an infinite number of distinct types or orders of entities in his ontology. The most basic order is the types of individuals. The next higher order is the order of n-ary properties that can be exemplified by individuals (this includes propositions). From then, for any order n there is an order n+1 such that n+1 consists of n-ary properties that can be exemplified by the entities in n. Further, at each "level" there is an analogous distinction to that between abstract and ordinary individuals. Abstract and ordinary objects of any type can be distinguished by an axiom that asserts that an object is ordinary iff, necessarily and always, there is no object of a higher type that it encodes.[104]

This expansion in metaphysics is required to address the full range of apparent counterexamples to Substitutivity. Recall that Zalta has a structured view of propositions. Now, imagine a *de re* attitude report such that Kate believes of an animal in a cage that it is a woodchuck. If the report is true, Kate stands in a relation of believing to the proposition denoted by the phrase 'the animal in the cage is a woodchuck' where the property denoted by 'woodchuck' is an ordinary (i.e. non-abstract) property and the thing denoted by 'the animal in the cage' is an ordinary individual. However, Zalta maintains that there are contexts in which the truth of Kate's attitude reports are dependent, not on the ordinary property and ordinary individual denoted by the relevant terms, but on her cognizing of the individual and property denoted by the relevant terms via agent specific modes of representation. Imagine a scenario in which Kate is at the fair. At this fair, a genetically altered animal, that Kate would identify as a woodchuck, is being displayed in a cage. It is named 'experimental animal #107', but Kate

[104] Ibid, 243.

doesn't know that. This animal is a groundhog, and groundhogs are one and the same species of animal as woodchucks. Zalta notes[105] that, in such a context, all of the following are true:

1. Kate believes that the animal in the cage is a woodchuck.
2. Kate does not believe that the animal in the cage is a groundhog.
3. *Being a woodchuck* just is *being a groundhog*.

This situation is analogous to the previously discussed example of Mary's beliefs about Mark Twain and Samuel Clemens. All three of these sentences can be true. Kate does not know that sentence 3 is true. Now consider the following which are also true in this context:

4. The animal in the cage is experimental animal #107.
5. Kate believes that experimental animal #107 is a woodchuck.

Because sentences 4 and 1 are true, a *de re* reading of sentence 5, such that we do not take 'woodchuck' to occur in an oblique context, is also true. That is to say that Kate believes of the animal denoted by 'experimental animal #107' that it is a woodchuck. But, she would not believe that 'Experimental animal #107 is a woodchuck' is true as she does not know that 4 is true. So, the following are also true:

6. Kate does not believe that experimental animal #107 is a woodchuck.
7. Kate does not believe that experimental animal #107 is a groundhog.

As previously mentioned, Kate does not know that sentence 4 is true. So, she does not cognize the animal in the cage as being experimental animal #107. So, in the absence of that context, she would neither believe that experimental animal #107 is a woodchuck nor believe that experimental animal #107 is a groundhog.

Zalta takes the fact that there is an interpretation of sentences 1-7 on which that set of sentences is consistent to indicate that, in some contexts (but not in others), the meanings of attitude reports are linked to the cognitive content of relevant terms for a specific agent. Zalta maintains that, in the context in which sentence 6 is true, the proposition denoted by

[105] Ibid, 167.

'experimental animal #107 is a woodchuck' is not composed of the ordinary individual that is experimental animal #107 and the property of *being a woodchuck*. Instead, the proposition is composed of the abstract individual that is the $\mathbf{Sense_1}$ of 'experimental animal #107' for Kate and the abstract property that is the $\mathbf{Sense_1}$ of 'woodchuck' for Kate.[106] In contrast, the context in which sentence 5 is true in one in which the proposition denoted by 'experimental animal #107 is a woodchuck' is composed of an ordinary individual and an ordinary property. In this context, the proposition believed is the same proposition as the proposition denoted by 'the animal in the cage is a groundhog'.

As such, the terms denoting in the sentences involving belief attribution are ambiguous as to what they denote. There are two distinct readings of the sentences such that there is ambiguity between a reading where the proposition believed denotes an ordinary individual and an ordinary property or a reading where the proposition believed denotes an abstract individual and an abstract property. Zalta seeks to build a means of representing each reading in his logical language such that there is no ambiguity.

Solving Substitutivity and Existential Generalization

It should be clear at this point that Zalta believes that abstract objects can play the role of senses in all cases in which appeal to senses are required to solve intensional puzzles. I will now provide the details of Zalta's solution to the problem of Substitutivity relative to the subject of some attitude.[107] In the case of Mary:

1. Mary believes that Mark Twain wrote *Huckleberry Finn.*
2. Mark Twain is Samuel Clemens.

[106] Because Kate does not know what the term 'experimental animal #107' refers to, the abstract individual in question will not encode *being a woodchuck* or *being the animal in the cage*.
[107] *Intensional Logic and the Metaphysics of Intentionality*, 172-173.

The principle of Substitutivity would entail:

3. Mary believes that Samuel Clemens wrote *Huckleberry Finn.*

This is an apparent counterexample as sentence 3 seems false given that Mary does not know who Samuel Clemens is. Zalta maintains that this apparent counterexample to the principle of Substitutivity trades on an ambiguity in the sentential expression 'Mark Twain wrote *Huckleberry Finn*' in sentence 3. That sentential expression, as it occurs in sentence 3, might be taken to denote either of two different things.

a. a proposition that has an ordinary individual (Samuel Clemens) and an ordinary property *(being the writer of Huckleberry Finn)* as its constituents. This is a *de re* reading of 3.
b. a proposition that has an abstract individual (that encodes all and only the properties that Mary associates with the referent of 'Samuel Clemens') and an abstract property (that encodes all and only the second order properties that Mary associates with the property of *being the writer of Huckleberry Finn*).

On the a. reading of sentence 3, sentence 3 is true. So, this is not a case where true premises lead to a false conclusion. This reading does not yield a counter example to Substitutivity. On the b. reading of sentence 3, sentence 3 is false. However, the occurrences of 'Samuel Clemens' in sentences 2 and 3 denote different things. In sentence 2, it denotes the ordinary individual Samuel Clemens. On the b. reading of sentence 3 it denotes an abstract individual. This purported counterexample will only be an instance of an inference licensed by Substitutivity if 'Samuel Clemens' is used the same way in sentence 2 as it is in sentence 3. However, if one interpreted the instance of 'Samuel Clemens' in sentence 2 as denoting the same abstract individual as does the instance in sentence 3, sentence 2 would no longer be true. There is no reading of 3 on which the inference from premises 1 and 2 to the conclusion 3 is genuinely licensed by Substitutivity and on which sentences 1 and 2 are true while 3 is false.[108]

[108] Ibid, 161-165.

From this exegesis I can also provide Zalta's solution to the problem instances of Existential Generalization. Recall the putative counterexample:

1. Ralph believes that the tallest spy is a spy;
2. Therefore, something is such that Ralph believes it to be a spy.

The context in which this appears to be a counterexample is a context in which Ralph does not know who the tallest spy is and the sentential expression 'the tallest spy is a spy' in sentence 1 denotes a proposition that is trivially true. In that context, 1 would be true, but it would be false to conclude that there is some particular person whom Ralph believes to be a spy. Zalta attempts to explain away the apparent counterexample by appealing to an ambiguity in premise 1. We can read the definite description 'the tallest spy' in sentence 1 as denoting one of two things:

a. the ordinary individual that is the tallest spy*; and*
b. the abstract individual that encodes all and only the properties that would make something the tallest spy.

The a. reading of 1 would, if true, render 2 true as well. Assuming that there is a tallest spy, on this reading, that spy would have the property of *being believed by Ralph to be the tallest spy*. As such, and assuming that spies are persons, it follows that there is some person such that Ralph believes that person to be a spy. The b. reading of 1 is the reading that renders trivial the content of Ralph's belief. Because, on the b. reading, the thing denoted by 'the tallest spy' is an abstract object, it will not exemplify *being a person*. To arrive at sentence 2 via use of Existential Generalization would require the additional false premise 'the abstract entity that is **Sense$_2$** for the denotation of 'the tallest spy' exemplifies *being a person*.' Since that premise is false, these sentences do not constitute a counterexample. What does validly follow from a b. reading of sentence 1 is that Ralph believes there to be spies[109]

[109] Ibid, 184-186

A Complete Account of the Syntax of Zalta's Intensional logic

I can now provide a complete account of Zalta's intensional logic with the capacity to express his metaphysics and solve the problems of intensionality that he has set out to solve. I will begin with the syntax. To begin, the type 'i' is the type for individuals. '$<t_1 \ldots t_n>$' is the type of n-ary properties where 't' is a variable that ranges over any types. '$<>$' is the type for propositions since they are 0-ary relations. These types categorize both the entities in the domain of discourse and the terms that denote them. TYPE is the set of entities such that individuals, their n-ary properties, and propositions are members. Where 'i' is the type of individuals, 'i' is a member of TYPE. Further, Zalta defines TYPE recursively. Where $t_1 \ldots t_n$ are members of TYPE, $<t_1 \ldots t_n>$ are members of TYPE.[110]

$a^t_1 \ldots a^t_n$ represent non-context dependent names of objects of type t.[111] Context dependent names, such as indexicals, will always be of type 'i'. For every type t, the variables of the language are represented as $x^t_1 \ldots x^t_n$. There are four distinguished names in the language. '$E!^{<t>}$' represents the existence predicate. For all types t '$=E^t$' represents the identity predicate. 'Ex' is the exemplification predicate and is of type $<<t_1 \ldots t_n>t_1 \ldots t_n>$ where $t_1 \ldots t_n$ are any type. $Tr^{<>}$ is the explicit truth predicate for propositions.[112]

For atomic terms and atomic propositional formulas, Zalta defines them recursively using nine clauses. Atomic terms are defined as: all primitive terms (i.e. non-context dependent names) for objects of type t are terms of type t. As for atomic formulas, if '$\boldsymbol{\tau}$'[113] is a term of type $<>$, then $\boldsymbol{\tau}$ is a propositional formula. In other words, if some term is of the proposition type, it is a propositional formula. Further, if 'ρ'[114] is a term of the type $<t_1 \ldots t_n>$ and $\boldsymbol{\tau}_1 \ldots \boldsymbol{\tau}_n$ are terms of type

[110] Ibid, 231.
[111] I will deviate from the standard use/mention convention in this section for the sake of clarity.
[112] *Intentional Logic and the Metaphysics of Intentionality*, 132.
[113] A variable that ranges over terms.
[114] A variable that ranges over n-ary property and relation terms.

$t_1 \ldots t_n$, respectively, then $\rho\, \boldsymbol{\tau}_1 \ldots\, \boldsymbol{\tau}_n$ is a propositional formula. This just constructs atomic propositional formulas that consist of n terms of type $\boldsymbol{\tau}$ that follow an n-ary term of the next higher type. As for encoding propositions, if ρ is a term of type $<t>$ and $\boldsymbol{\tau}$ is a term of type t, then $\boldsymbol{\tau}\rho$ is a propositional formula.[115]

Complex formulas can be constructed for any two propositional formulas Φ and Ψ and name variable a, such that a is not an initial variable in Φ, by adding standard symbols of the logic the reader should be familiar with such as '$\sim$', '$\rightarrow$', '$\exists$' etc. Lambda and iota terms are complex terms. If Φ is any propositional formula and $a_1 \ldots a_n$ are variables with types $t_1 \ldots t_n$, respectively, such that none of the a's are initial variables somewhere in Φ, $[\lambda a_1 \ldots a_n \Phi]$ is a term of type $<t_1 \ldots t_n>$. If Φ is any formula and a^t is any variable of type t, then $(\iota a)\Phi$ is a term of type t.[116]

The last two definitions are definitions of complex terms that are sense terms and sense descriptions. If $k^t\sigma$ is any primitive term of type i, then $\underline{k_\sigma}$ is a term of type t. The underline is meant to signify that the term k_σ is a sense term denoting the abstract object that plays the role of the sense of the term k for the individual denoted by σ. Further, if Φ is any propositional formula and a^t is any variable of type t, then $\underline{(\iota a)\Phi}$ is a term of type t. The underline here serves to signify that the term is a sense description denoting the abstract object of type t that is the individuating concept that encodes Φ.[117]

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[115] *Intensional Logic and the Metaphysics of Intentionality,* 232-233. As the reader might expect at this point, in an encoding formula, the term of type $\boldsymbol{\tau}$ precedes a predicate of a higher type.
[116] Ibid, 233.
[117] Ibid*,* 234-235

A Complete Account of the Semantics of Zalta's Intensional logic

Now, I can return to the semantics as presented in chapter 2[118] and present a complete semantics for the language. An interpretation of the language is represented by a 9-tuple of the form <**D**, (**W**,**w0**), (**T**,**t**,**<**), $\mathbf{ext}_{w,t}$, **L**, $\mathbf{ext}_{A}$, **C**, **F**, **sen**>.

- **D** is a union of nonempty sets $\mathbf{D}_{t}$ where $\mathbf{D}_{i}$ is the set of individuals, $\mathbf{D}_{<>}$ is the set of propositions, and $\mathbf{D}_{<t1...tn>}$ is the set of n-ary properties. **R** is a distinguished subset of **D** that has higher order objects as its members such that **R** is the union of $\mathbf{D}_{t}$ where t does not denote the type 'i'. '**o**' and '**r**' are metavariables that range over the members of **D** and **R** respectively;
- **W** is the set of possible worlds and **w0** is the member of W that is the privileged actual world;
- **T** is the set of times and **t0** is a member of T that is the privileged actual time t. **<** is a binary relation on **T** that indicates temporal order;
- $\mathbf{ext}_{w,t}$ is a function that maps each member of R to the ordinary or abstract individuals that, at some **w** and some **t**, exemplify those properties;
- **L** is a set of logical functions that includes functions such as negation, universalization, conversion, necessitation, and past and present omnitemporalization;
- $\mathbf{ext}_{A}$ is a function that maps each member of $\mathbf{R}_{<t>}$ to a subset of $\mathbf{D}_{t}$. It maps each property of type t objects to an encoding extension;
- **C** is the set of contexts that has three functions. The functions respectively map the indexicals 'I', 'you', and 'the' to the appropriate member of $\mathbf{D}_{i}$. These functions map contexts to the appropriate denotation of the indexical;

[118] pp. 21-23.

- **F** is a function that assigns primitive names to elements of $\mathbf{D_t}$;
- **sen** is a function, for both primitive and context dependent names of type t, that identifies the individual **o** to the abstract object that serves as the sense of names k in context **c**.[119]

Substitutivity and Existential Generalization in the Language

Having discussed both Zalta's treatment of Substitutivity and Existential generalization and his formal intensional logic, I can now represent his treatments in the formal language. I will begin with an example of Zalta's treatment of Substitutivity. Let '$(\iota x)\Phi_1$' denote the animal in the cage (which happens to be a groundhog named 'experimental animal #107').

1. Being a woodchuck is just being a groundhog.
    a. $W=_E G$ (where 'W' denotes the property being a woodchuck and 'G' denotes the property being a groundhog)

This expresses the fact that the properties of Being a woodchuck and being a groundhog are just the same properties.

2. Kate believes that the animal in the cage is a woodchuck.

In this context, 'the animal in the cage is a woodchuck' denotes a proposition composed of an abstract individual that encodes all and only the properties that Kate associates with the term 'the animal in the cage' and an abstract property that encodes all and only the second-order properties that Kate associates with the term 'is a woodchuck'. The sentence is represented as:

b. '$B(k,W_k(\iota x)\Phi_1)$'

Here, 'B' denotes a two-place belief relation between an individual, Kate (represented as '$_k$'), and a proposition. The reader should notice the underlines beneath the property and denoting

[119] *Intensional Logic and the Metaphysics of Intensionality,* 236-237.

phrase in premise 2. Further, there is a subscript corresponding to the 'k' that represents 'Kate' next to the letters denoting the property. These represent the notions of the cognitive content of the properties and denoting phrases and agent relativity respectively. Notice that in sentence 1, 'G' is neither underlined nor subscripted.

3. Kate does not believe that 'the animal in the cage is a groundhog' is true.

Similar to sentence 2, 'the animal in the cage is a groundhog' denotes a proposition composed of an abstract individual that encodes all and only the properties that Kate associates with the term 'the animal in the cage' and an abstract property that encodes all and only the second-order properties that Kate associates with the term 'is a groundhog.' The sentence is represented as:

c. $\sim B(k,\underline{G_k}(\iota x)\underline{\Phi_1})$

This set of sentences (on the intended interpretation) and their logical counterparts are consistent. As such, Zalta represents sentences 1 and 3 such that 'G' and '$\underline{G_k}$' are different terms that represent different entities. In 1, 'G' denotes a groundhog. In 3, '$\underline{G_k}$' denotes an abstract individual that encodes all and only the properties that Kate associates with the referent of 'Groundhog'. As such, this is not a genuine case of Substitutivity as no inference can be drawn from sentence 1 to sentence 3 via substitutivity.

As for Existential Generalization, let '$(\iota x)\Phi_1$' denote the ordinary individual (if there is one) who is the tallest spy. Let '$\underline{(\iota x)\Phi_1}$' (note the underline) denote the abstract individual that encodes the property of *being the tallest spy*.

1. Ralph believes that the tallest spy is a spy.

The representation of sentence 1 on which the content of Ralph's belief is completely trivial is:

a. $B(r,S\underline{(\iota x)\Phi_1})$

Existential Generalization allows for the inference from sentence 1 to:

2. Ralph believes that there are spies. Represented as:
   b. $(\exists x)B(r,Sx)$

Notice, again, the underline of '$\underline{(\iota x)\Phi_1}$'. This also indicates that the logic representing 'the tallest spy' denotes an abstract object that encodes all and only the properties that Ralph associates with *being the tallest spy*. As such, 2 follows as there is something such that Ralph believes it to be a spy. However, we are not forced to conclude from premise 1 that the tallest spy is some particular person. 'The tallest spy', here, denotes an abstract individual and not an ordinary individual that is a person and has the property of *being a spy*. Ultimately, Existential Generalization, in this case, just guarantees from sentence 1 that Ralph believes that there are spies.

Closing Matters

For my purposes in this thesis, the entirety of the relevant material from Zalta's *Intensional Logic and the Metaphysics of Intentionality*, has been presented. What remains now is to explore whether a nominalist adoption of Zalta's solutions concerning Existential Generalization and Substitutivity is possible. In the following chapter, I will start by presenting what I take to be possible nominalist adoptions. To the extent that they are adequate, I will have presented nominalist adoptions of Zalta's theory for all four principles. What remains, then, is to make sure these solutions "play nice" with each other. I mean to say that it may well be the case that one nominalist adoption is inconsistent or otherwise in tension with another. As such, it is necessary to tease out the entailments from specific nominalist adoptions of Zalta's theory that may pose problems for others. Then, I will attempt to provide a cohesive, overarching account of the extent to which a nominalist might use any or all of Zalta's theory.

Chapter 5: Nominalist Adoptions of Zalta's Treatment of Existential Generalization and Substitutivity and Concluding Matters

In this final chapter, I will discuss potential nominalist adoptions of Zalta's treatment of Substitutivity and Existential Generalization covered in the previous chapter. His treatment of these two principles involves a distinction between ordinary and abstract properties such that the latter play the role of Fregean senses. A discussion of potential nominalist adoptions of Zalta's preservation of these principles will require a more in-depth discussion of this distinction. This will allow for more clarity in discussing what our hypothetical nominalists are committed to. Then I will discuss an Azzounian adoption of Existential Generalization and Substitutivity. I will ultimately conclude that Azzouni can utilize the entirety of Zalta's theory with seemingly little to no issue. However, for the non-Azzounian nominalist, I will attempt to provide further solutions to Substitutivity and Existential Generalization. However, I will conclude that, while the non-Azzounian nominalist may be able to adopt a Zaltian treatment of Existential Generalization, such a nominalist only has access to the portion of Zalta's treatment of Substitutivity that involves terms that denote individuals. After this, I will evaluate the extent to which a non-Azzounian nominalist can utilize Zalta's system. The question is whether the non-Azzounian nominalist can utilize Zalta's *system* or is limited to only some of his solutions. I will argue that tension arises because the non-Azzounian nominalist, who adheres to the Quinean dictum, has either a seemingly unavoidable ontological commitment to abstract individuals and abstract properties or a limited acceptance of Zalta's treatment of the logical principles of Strong

Extensionality, Existential Generalization, and Substitutivity. This is due to the fact that Zalta quantifies over both abstract properties and individuals. The non-Azzounian nominalist, I maintain, might find a suitable analogue for abstract individuals that can play the role of Fregean senses. However, I find no such analogue for abstract properties.

Azzounian Nominalism and the Ordinary/Abstract Property Distinction

First, I would like to remind the reader that Zalta's solutions to the putative problems of Substitutivity and Existential Generalization require quantification over an expanded range of abstract objects that includes abstract properties and abstract individuals. Zalta is very clear in how he distinguishes abstract individuals from ordinary individuals. Ordinary individuals exist in his technical sense of the term: they possibly, at some time, have a location in space.[120] Abstract individuals can never occupy space. Further, Zalta is clear that ordinary individuals cannot exemplify abstract properties.[121] Ordinary individuals can, of course, exemplify ordinary properties. Zalta is, however, less clear in distinguishing abstract and ordinary properties. Abstract properties, on Zalta's account, generally encode the properties that other properties exemplify. There are no ordinary properties in Zalta's metaphysics that encode properties.[122] So, similar to abstract and ordinary *individuals*, abstract and ordinary properties can be distinguished by their ability to encode properties. However, ordinary and abstract individuals are distinguished, in part, by virtue of the fact that only the former exist, there seems to be no analogous distinction with respect to abstract and ordinary properties. While Zalta does not take properties to literally exist, maybe he could include an existence analogue for properties such that ordinary properties are said to exist when they can, at some time, be exemplified by an

[120] *Intensional Logic and the Metaphysics of Intentionality*, 21.
[121] Ibid, 160.
[122] Ibid, 160.

ordinary individual. This, however, would not cover all of the properties Zalta considers ordinary. For example, *being prime* is a property that Zalta would take to be ordinary. However, *being prime* is not a property that an ordinary individual can exemplify. Certain numbers exemplify the property of primness and numbers are abstract. Ordinary objects (or collections thereof) might exemplify the property of *having a prime cardinality*, but (collections of) ordinary objects themselves are not simply prime. There are no ordinary individuals that have this property. We cannot say that *being prime* is ordinary on a view that takes the ordinary/abstract property distinction to have a component analogous to the distinction between ordinary and abstract individuals with respect to existence, as an ordinary object will never exemplify *being prime*. were an existence analogue to distinguish ordinary properties from abstract properties, it would not satisfy the E! predicate as that predicate deals specifically with spatiotemporal location.

This lack of an existence analogue should not pose a problem for the Azzounian nominalist. Azzouni need not worry about ontological commitment to these higher order abstract properties that, in some cases, play the various roles of Fregean senses. He can take them to be ultra-thin posits just as he can with abstract individuals. For example, recall the property denoted by both 'being a groundhog' and 'being a woodchuck'. Zalta claims that differences in an agent's representation of the terms that denote the property can be accounted for by positing abstract properties that play the roles of Fregean senses.[123] My account of an Azzounian adoption of *Existential Generalization* already places the abstract individuals required into the ultra-thin posit category.[124] I see no reason why we cannot do this for abstract properties too.[125] This also

[123] Ibid, 161.
[124] pp. 37-38.
[125] Further, Azzouni will take ordinary properties to be ultra-thin posits. The distinction for the Azzounian nominalist is that abstract properties would be posited as entities that can encode properties.

applies to Existential Generalization. The same entities are required to provide a solution. So, Azzouni can adopt a Zaltian treatment of the problems of intensionality discussed in Chapter 4. As such, it should be clear that Azzouni's nominalism allows him to utilize the entirety of Zalta's logic in addressing the four putative problems of intensionality.

Non-Azzounian Nominalism and the Ordinary/Abstract Object Distinction

What, though, about the non-Azzounian nominalist? As I have made clear, Zalta requires quantification over abstract individuals, ordinary properties, and abstract properties for his treatment of Existential Generalization and Substitutivity.[126] Can we turn to trope theory as a solution as we did with Strong Extensionality? I would like to remind the reader here of the potential trope theorist adoptions of Zalta's treatment of Strong Extensionality covered in Chapter 3.[127] I maintain that the nominalist who accepts the Quinean dictum might adopt Zalta's rejection of Strong Extensionality if said nominalist is willing to posit sets of tropes that play the role of properties. What I did not cover in Chapter 3, however, is a non-Azzounian adoption of Zalta's treatment of *Existential Generalization.* This would be an incredibly difficult (if not impossible undertaking) for the nominalist who rejects the Quinean dictum. This is because, assuming the nominalist can utilize an entity that plays the role of abstract object, there is still the issue of quantification tracking ontological commitment. The non-Azzounian nominalist would have to quantify over entities that play the role of abstract individuals. This nominalist would, therefore, be committed to the existence of those entities that play the role of abstract individuals. Thus, the inference from 'Ponce de Leon searched for the fountain of youth', for example, to 'Ponce de Leon searched for something that exists' would be licensed. The English

[126] *Intensional Logic and the Metaphysics of Intentionality*, 160.
[127] pp. 39-41.

‘There is’ and ‘There exists’ are both represented in the language of classical logic using the existential quantifier. In any case, the Quinean dictum guarantees ontological commitment from the existential quantifier. So, the nominalist who accepts the Quinean dictum is committed to *Existential Generalization* being a valid inference. Zalta rejects *Existential Generalization* and the inferences that it licenses. So, in utilizing entities that play the role of abstract individuals *and* accepting the Quinean dictum, nominalists block themselves from adopting a Zaltian treatment of *Existential Generalization.*

It may be possible for the nominalist to construe abstract individuals as sets of sets of tropes that can play the role of Fregean senses, however. This would allow for the non-Azzounian nominalist to quantify over them. The idea is that a set of sets of tropes grouped by similarity might play the role of an abstract object that encodes the properties that an agent associates with individual terms. Take, for example, the name ‘Mark Twain’. Now, imagine a set of mustache tropes, a set of writer tropes, a set of unkempt hair tropes, etc... The set of these sets could possibly play the role of modes of presentation, individuating concepts, or act as the object denoted in oblique contexts. Recall Mary, who does not know that Mark Twain is Samuel Clemens. We can reject the inference ‘Mary believes that Samuel Clemens wrote *Huckleberry Finn*’ that is seemingly licensed by the premises ‘Mark Twain is Samuel Clemens’ and ‘Mary believes that Mark Twain wrote *Huckleberry Finn*’. This is because ‘Samuel Clemens’ denotes a set of sets of tropes in ‘Mary believes that Samuel Clemens wrote *Huckleberry Finn*’ and denotes the object ordinarily referred to as ‘Samuel Clemens’ in ‘Mark Twain is Samuel Clemens’. Thus, this putative counterexample is not a counterexample at all and the principle is preserved. This is analogous to Zalta’s solutions that I outline in Chapter 4.[128]

[128] pp. 52-55.

Something similar could be done for Existential Generalization. The putative counterexample claims that from the trivial 'Ralph believes that the tallest spy is a spy', Existential Generalization licenses the inference 'Some particular thing is such that Ralph believes it to be a spy'. This second sentence is seemingly false as Ralph does not believe of any particular person that that person is a spy. However, the nominalist might maintain that Ralph believes of a set of a set of tropes that it is a spy, making the conclusion true. So, this putative counterexample is not a genuine instance of Existential Generalization, and the principle is preserved. This might provide an analogue for the entirety of Zalta's treatment of Existential Generalization. This is to say that Zalta's example of Ralph believing the tallest spy to be a spy does not involve terms that denote abstract properties. Further, Zalta *accepts* Existential Generalization and the inferences it licenses. Therefore, if a nominalist that accepts the dictum finds an entity to play the role of abstract individuals, it seems as though that nominalist can adopt Zalta's treatment of Existential Generalization. However, because of the fact that Zalta does not utilize a counterexample to Existential Generalization that requires appeal to abstract properties does not entail that such counterexamples do not exist. So, whether or not the non-Azzounian nominalist can adopt the entirety of Zalta's treatment of Existential Generalization seems to rest on whether or not there are putative counterexamples to Existential Generalization that involve terms denoting properties rather than individuals.

Abstract individual analogues, though, do not provide an analogue for the *entire* treatment of Substitutivity. Zalta's treatment of Substitutivity (and possibly Existential Generalization) requires quantification over abstract properties. The nominalist runs into trouble here by not having a counterpart for abstract properties. As it stands, then, this sort of nominalist may only utilize the parts of Zalta's treatment of Substitutivity that quantify over abstract

individuals. The non-Azzounian nominalist's adoption, then, seems quite limited: the non-Azzounian nominalist cannot adopt Zalta's treatment of *Existential Generalization* and may only adopt a portion of Zalta's treatments of Substitutivity and (possibly all of) Existential Generalization. In order to adopt Zalta's treatment of *Existential Generalization* and complete treatment of Substitutivity, it seems as though the nominalist will have to reject the Quinean dictum and follow Azzouni in adopting an existence predicate. While this rejection of the Quinean dictum would not entail a commitment specifically to Azzouni's nominalism, it will entail adhering to a nominalism that is *prima facie* very similar to Azzouni's.

For the nominalists that would like to continue to adhere to Quine's dictum, they might fracture Zalta's logic such that it only concerns Zalta's treatment of Strong Extensionality. The idea is that a nominalist could make use of a second order logic (on which the second order variables quantify over predicates as opposed to properties)[129]and trope theory such that only ordinary individuals, properties understood as sets of tropes, and abstract individuals understood as sets of sets of tropes fall under the range of the quantifier. This will allow the nominalist to follow Zalta in rejecting Strong Extensionality as I outlined in Chapter 3[130] and follow Zalta in preserving Existential Generalization and a portion of Substitutivity. Given that this second order logic is divorced from the rest of Zalta's theory, it will not have the ontological baggage that comes with the full system. There will not be any abstract individuals or abstract properties other than sets (or sets of sets) of ordinary individuals that stand in the way of the nominalist's desire for parsimony. Additional ontological commitments will be required to reap the remaining benefits of Zalta's logic, however.

[129] These predicates are taken to be purely linguistic items, and as such, are taken to be ordinary objects.
[130] pp. 39-41.

It also seems possible to limit the nominalists' reliance on Azzounian nominalism by introducing an assumption of logical pluralism. At its simplest, logical pluralism is the position that it is not the case that there is merely one correct logic. More specifically, logical pluralism might claim that logics are formal representations of reasoning patterns. Importantly, two logics might differ about which reasoning patterns are valid while simultaneously being "correct" with respect to a range of contexts.[131] Maybe, then, it would be possible to accept two logics. The first would be similar to the second order logic I presented in the previous paragraph.[132] It would provide a nominalist adoption of Zalta's treatment of Strong Extensionality, Existential Generalization, and some of Substitutivity. The second logic would need to make use of an existence predicate to track ontological commitment (rather than the existential quantifier), as does Azzouni's nominalism, in order to adopt Zalta's treatments of *Existential Generalization*, and a complete solution to the problem of Substitutivity. However, it is unclear to me what benefit comes from merely limiting reliance on an existence predicate. I fail to see what this option provides in terms of a theoretical power to parsimony ratio that is not provided by the Azzounian approach to all four problems of intensionality. Further, the second logic that deals with the two problems other than Strong Extensionality and Existential Generalization will still have the necessary resources to address Strong Extensionality and Existential Generalization. This logic will still have all the required posits in its domain, as well as the Zaltian semantics and axioms. So, the first logic that deals solely with Strong Extensionality and Existential Generalization would be redundant. As a result, I am tempted to say to a nominalist who adopts trope theory and rejects Azzouni's approach, "You can have an existence predicate, or you can

[131] Russell, Gillian and Christopher Blake-Turner, "Logical Pluralism", The Stanford Encyclopedia of Philosophy, https://plato.stanford.edu/archives/fall2023/entries/logical-pluralism.
[132] A logic that takes second order variables to quantify over predicates rather than properties.

have a solution to the problems of Strong Extensionality and Existential Generalization, but you can't have both." The nominalist may either choose to only adopt Zalta's treatment of Strong Extensionality and Existential Generalization *or* take something more akin to the complete Azzounian route.

Closing Matters

In this thesis I have presented many of the details of Zalta's logic and metaphysics and of Azzouni's nominalism. I have outlined the relevant elements of both required to demonstrate my conclusion that:

1. Azzouni provides a nominalism that can adopt Zalta's solutions to apparent counterexamples that arise with respect to the inferences seemingly licensed by *Existential Generalization*, Strong Extensionality, Existential Generalization, and Substitutivity in their entirety and;
2. the nominalist that wants to maintain a commitment to Quine's dictum is left with only the possibility of adopting Zalta's treatment of the problems of Strong Extensionality, Existential Generalization, and a portion of Substitutivity that involves terms that denote individuals rather than properties.

In Chapter 1, I laid out a basic groundwork for understanding Zalta's metaphysics. I further explained some of the more fundamental elements of that metaphysics while introducing the reader to the problems concerning *Existential Generalization* and Strong Extensionality. In Chapter two, I presented a larger portion of Zalta's metaphysics and demonstrated how Zalta's metaphysics purports to solve those problems. I finished Chapter 2 by providing portions of Zalta's formal logic that correspond to the metaphysics covered in that chapter. Chapter 3 first introduced nominalism more generally, then introduced the nominalism of Jody Azzouni. In Chapter 3 I provided an Azzounian adoption of Zalta's treatment of Strong Extensionality and *Existential Generalization.* I further provided a trope theory approach to accepting Zalta's treatment of Strong Extensionality that does not necessarily rely on the use of an existence

predicate. Chapter 4 introduced the problems of Existential Generalization and Substitutivity. Then I outlined the expansions of Zalta's metaphysics required to solve the purported problem instances of these two principles and explained how Zalta attempts to solve these purported problems. I concluded Chapter 4 by providing an expanded account of Zalta's formal language. Chapter 5, as you have just read, demonstrates that the Azzounian nominalist can seemingly adopt the entirety of Zalta's logic without issue. However, I argued that the trope theorist who rejects Azzouni's approach and continues to adhere to Quine's dictum has only one real option. The non-Azzounian trope theorist must settle for merely taking Zalta's treatment of Strong Extensionality, Existential Generalization, and a portion of Substitutivity while leaving the remaining problems unsolved (or solving them in some other manner).

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