What is conversation theory?

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Abstract

The purpose of the following text is to give readers a general introduction to Gordon Pask's conversation theory, which is considered in this text to be a cybernetic and epistemological account of meaning-making through conversational discourse and practice. While Pask devoted three lengthy tomes in regard to articulating the theory and its applications, I believe it is necessary to give readers who are interested in his work a general introduction to what I believe are the key epistemological features of his work. I argue that conversation theory should be considered an inferential account of meaning-making rather than a representational account, by virtue of Pask's argument that a concept must be a process that involves many concepts.

Conversation theory is defined in this text as an epistemological theory specifically examining the role of conversation regarding concept-sharing and concept-forming between different perspectives. It can be described as a "formal theory of conversational process" (Scott, 2011, p. 133), by virtue of abstracting the content of conversations to specifically examine the processes and forms that emerge through conversational activity. By *conversation*, I refer to how participants are able to give questions, commands, or explanations to one another in order to convey or form concepts. Conversation permits participants who are engaged with each other to collaborate in complex ways: This arises through allowing conversational participants to reach agreements on what is to be "understood" by a designated concept (Pangaro, 2017, p. 1580). I do not intend to give a definitive guide to conversation theory, as such a guide cannot be conveyed in a short paper (Scott, 2011, p. 305); nevertheless, the text will introduce the reader to a simplified yet integrated account of how conversations, concepts, memories, and perspectives epistemologically relate to each other within its context. While Pask and associates have attempted to simplify conversation theory for a general audience (Pask, 1976a; Scott, 2011, 2021; Pangaro, 2017, 2019; Laurillard, 2002, 2012), I believe drawing parallels

between conversation theory and what has come to be known as *inferential semantics* will help in contextualising conversation theory as an inferential theory of conversational activity. Conversation theory was developed by cybernetician, psychologist, architect, and educational theorist Gordon Pask between 1960 and 1970 at his company Systems Research, Ltd. During this time—and with the aid of Bernard Scott, Dionysius Kallikourdis and others—Pask compiled three books: the green book *Conversation, Cognition and Learning* (Pask, 1975a), the white book *The Cybernetics of Human Learning and Performance* (Pask, 1975b), and the purple book *Conversation Theory: Applications in Education and Epistemology* (Pask, 1976b).

The text will mostly focus on the green book, as it is in my opinion the work which best sets up conversation theory as a formal theory of concept-forming and concept-sharing through means of conversation, whereas the white book and the purple book focus more on developing, expanding, or revising aspects of conversation theory. In focusing on the contents of the green book, I draw comparisons to the thought of Robert Brandom, Jaroslav Peregrin and others associated with the Pittsburgh School of Philosophy. I do this to show how the conception of concepts found in the educational cybernetics of Pask and associates and the type of conception of concepts found in what has come to be known as inferential semantics are similar to one another. In doing so, I hope to set the groundwork for future dialogue between both areas of intellectual inquiry. This necessitates me articulating some of the similarities and differences of both areas of study, as well as demonstrating how concepts, memories, conversations, and perspectives form an integral discursive process in the context of conversation theory.

1   What is a concept?

As has been stated, conversation theory is about concept-sharing and concept-forming between different participants who are engaging in a conversation together (Pask & de Zeeuw, 1992, p. 39). This can be a conversation had between a teacher and their students on a particular topic, or a conversation had between different participants at a conference, or conversations had between different nation states, or even conversations had inside yourself with one perspective conversing with another perspective (Pask, 1975a, p. 406). I argue that Pask's notion of what a concept is in conversation theory, developed as an explicit rejection of the type of computational representationalist analogies that had been posited by John von Neumann; specifically, the idea that a concept is a representation that is stored in the brain like a file is stored in a filing cabinet.

In von Neumann's account, the way memory is stored in a computer system was likened to the way a memory or concept is stored in the brain (McCulloch, 2016, p. 100).

Yet Joseph Rouse has argued against such a notion based on the general biological inefficiency of such an approach:

> In both metabolic and cognitive terms, behavioural reliance upon decoupled representations could be difficult and dangerous for an organism in several critical respects: maintaining a substantial representational storage, sustaining sufficient real-time updating to enable those representations to remain responsive to perceptual inputs and relevant to action in diverse settings, and providing relevant access to what is then effectively a large representational database (Rouse, 2015, pp. 113-114).

Since maintaining representations is energy and resource intensive for conversational participants, viewing concepts as being generated non-representationally through a participant's interaction with their environment may reduce unnecessary resource use of cognitive resources: this is done by "off-loading" conceptual resources onto one's environment (Rouse, 2015, p. 114-115). In the context of conversation theory, such an environment would not only include a participant's non-conversational environment but also their conversational environment as well; such that, concepts can be offloaded onto other discursive beings as a form of collective memory storage. Pask rejected representational accounts of what concepts are: instead of seeing concepts as representations of what an object in purported to be (in the same way a picture of a tree purports the object of that particular tree in a photograph), he argued that "A concept is an organisation which forms a hypothesis, acts to satisfy the hypothesis, and tests for its confirmation or denial. It may thus also be interpreted as a 'problem solver' [...]" (Pask, 1975a, p. 244). In other words, instead of understanding a concept as being a representation that was meant to have a direct one-to-one correspondence with the thing that it refers too, Pask believed that a concept "must be some sort of process" (Pask, 1975a, p. 44). This is an idea I believe he originally derived from Lev Vygotsky who argued "The relationship of thought to word is not a thing but a process, a movement from thought to word and from word to thought" (Vygotsky, 1962, p. 251). There are two aspects I wish to stress to the reader here about this conception posed by Pask: firstly, that a concept can be envisaged as some kind of TOTE

cycle (which stands for test-operate-test-exit) and secondly, that the notion of a concept that is articulated here can be said to be inferential in nature.

Historically, the idea of a TOTE cycle was first used to emphasize the importance of feedback as a fundamental structure of activity in the nervous system (Miller, Galanter, & Pribram, 1960, p. 26-27). The idea of a TOTE cycle is as follows: Some kind of condition is posed to a given system which is the initial "test" the said system will attempt to satisfy, then that system will operate in relation to the posited "test" in order to pass the criteria set by the latter. If the system is unable to pass the test, then it will change how it operates until it passes the test and exits the cycle. It is thus hierarchical, yet also circular by virtue of being a cyclic process which exists only though the integration of both the level of the test and the level of the operation.

This hierarchical stratification is argued by myself to be an important feature in problem-solving activities. Following Lev Landa, I argue that if a system of a lower rank is unable to satisfy the conditions posed to it, then a system of a higher rank is engaged such that the latter system begins to direct or "steer" the actions produced by the former. In other words, "It, one might say, begins to control the controlling" (Landa, 1974, p. 75). This process that Landa describes is exactly the one captured by the TOTE cycle: Whereby if a system of lower rank produces undesirable output, then a system of a higher rank will reject its output and require the system of a lower rank to try something different so as to meet the higher ranked system's criteria.

It is also I argue—following Pask and associates (Pask, 1975a; Scott, 2011)—this process corresponds to conceptual emergence in conversation theory. In this type of discursive activity, a "hypothesis" is posited which acts as the testing criteria that "controls the controlling" of those sub-operations, sub-procedures and actions that are used to affirm that hypothesis. For example, a science teacher might assert the hypothesis "fool's gold isn't gold", which the student is meant to test. The student may perform operations in which the characteristics of fool's gold and gold are tested in regards to their chemical composition and physical properties. After this, the student describes their findings to their teacher in a way that either affirms the hypothesis or denies it. If the teacher is unsatisfied by their description, they get the student to repeat the activity until they have satisfied the hypothesis in the desired way (based on previous normative criteria that the teacher applies to the student's activity). Concept formation then for Pask, involves a process of iterative testing in order to affirm or deny a concept as being such-and-such.

Having explained the idea that concepts in conversation theory have the form of a TOTE cycle, I now wish to stress is the inferential nature of Pask's conception of the concept. I argue that Pask's conversation theory should be considered an inferential account of meaning-making as opposed to a

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representational account of meaning-making. Whereas a representational account will tend to presuppose some form of one-to-one direct correspondence with its object, an inferential account of meaning-making tends to view concepts not necessarily being determined by a specific point of reference; instead, such accounts appeal to the notion of appropriate inferential moves based upon standards of correctness (Peregrin, 2014, p. 3). In claiming a concept is thus-and-so, we are explicitly endorsing then a set of inferences which yield the conceptual content of an expression (Brandom, 2000, p. 19).

> The kind of inference whose correctness determine the conceptual contents of its premises and conclusions may be called, following Sellars, material inferences. As examples, consider the inference from "Pittsburgh is to the west of Princeton" to "Princeton is to the east of Pittsburgh," and that from "Lightning is seen now" to "Thunder will be heard soon". It is the contents west and east that make the first a good inference, and the contents of the concepts lightning and thunder, as well as the temporal concepts, that make the second appropriate (Brandom, 2000, p. 52).

Now, what has come to be known as inferential semantics, which will be described here as an inferential account of meaning-making, was inspired by the works of Wilfred Sellars who argued that to have one concept one must have a whole battery of concepts (Sellars, 1997, pp. 45-46). This view was later endorsed and developed by Robert Brandom, who stresses that the focus of meaning-making should not be on what is represented by something, but rather what is *expressed* by it (Brandom, 1994, p. 70). The precedence of meaning-making then becomes what is interpreted by such-and-such rather than what it purports to represent. Following Brandom, the ability to grasp a concept requires a certain mastery of the inferential moves; such inferential moves are required to yield the concept in question. Grasping the designated concept in question, involves understanding how the application of other concepts yields the concept in question, and how the concept in question is itself the product of this process. Thus, "One cannot just have one concept" (Brandom, 1994, p. 89). It is interesting to note that Pask's account of concept-sharing and concept formation explicitly endorsed this view two years prior (Pask & de Zeeuw, 1992) to Brandom's publication of his magnum opus *Making It Explicit* (Brandom, 1994), in which Brandom developed his conception of inferential semantics. This is evidenced by the following quotation from Pask and de Zeeuw:

> No concept may exist upon its own, only in a collegiate relation to other concepts which form a cluster [...] and are mutually responsible for production and reproduction (Pask & de Zeeuw, 1992, p. 39).

The general form of this assertion is demonstrated using entailment structures in conversation theory (Pask, 1975a, p.101). Such structures, being representational models in which the derivation of a concept from another concept is permitted (p. 554). Thus, Pask's conception of concepts corresponds to the view held by Brandom and others on the point that concepts are inter-defined.

In both conversation theory and inferential semantics then, a concept is composed of other concepts in which each concept must entail other concepts. In this emphasis of concepts entailing other concepts, Pask (1975a, p. 553) argues that a concept should not be treated as sets of things, but a procedure that seeks to maintain itself (Pask, 1975a, p. 553). In this way, a concept, *Conc,* can also be considered as a particular *indicated* relation R_i that can be spoken of in conversation. Such relations R_i belong to the conversational domain *R,* which is defined here as the domain in which we can speak of a relations R_i in conversation (Pask, 1975a, p. 44). A relation R_i can be said to exist on an index i of finite relations (where i is merely a single number on some arbitrary finite list of numbers). Based on these factors, the following statement can be said to hold:

$$Conc\ i\ (Ri)\ \triangleq\ Ri$$

Where the symbol $\triangleq$ means substitutable by definition. The expression can be said to hold based on the following assumption: If a participant indicates a relation in their environment, that relation can said to be the "head" relation R_H which subsumes other relations to itself; such that those other relations may yield R_H. Thus it follows that if R_i is substituted for R_H as seen in the expression $R_i = R_H$, then $Conc\ (R_H) \rightarrow R_H$ can be said to hold. Again, the reader must be reminded that a concept is "a procedure for doing something, not a class, that is somehow lodged in a mental register" (Pask, 1975a, p. 75). For generality then, a concept is a procedure which reconstructs or reproduces a topic relation R_H (Pask, 1976, p. 5). Finally, our concepts of our concepts have the property of potentially being in agreement with other people's concepts of their

concepts, on the condition that their is an isomorphism or one-to-one correspondence between our two conceptions (Pask, 1975a, p. 76). This is articulated formally in the following expression:

$$Proc_A i\,(X) \iff Proc_B i\,(X)$$

Where A and B can be said to be two conversational participants, the $\iff$ symbol refers to a isomorphism or one-to-one correspondence, and *X* is some arbitrary model, topic or relation that is conceived by each participant. Now, knowing that my concept of my concept parallels your concept of your concept is not a given in conversation theory: Following R. D. Laing and associates work on interpersonal perception, A is able to have a concept of *X* such that $Proc_A i\,(X)$, and A is also able to have a concept of B's concept of *X* such that $Proc_A i\,(Proc_B i\,(X))$ can be said to hold (Laing, Philipson, & Lee, 1964, pp. 54-55). But A only *purports* to understand B's concept of *X* in this expression, such that A could be wrong. I might see for example the way I act as cautious, but to some other it comes across as cowardly; yet I purport them to view me as cautious (Laing et al., 1964, p. 11). There thus needs to be a medium in which we can test our conceptions to see if our conceptions are more likely to agree with each other or not, and Pask's medium utilised in order to test the legitimacy of our conceptions is conversation.

2   How do conversations relate to concepts?

Having explored the notion of a concept within the context of conversation theory in relation to inferential semantics, I will now articulate how concepts relate to conversations in conversation theory's formal framework.

Let us envisage a hypothetical situation where two participants (say A and B) are conversing with each other. Following Paul Pangaro, a conversation begins "with a participant having some sort of goal, whether specific or general, articulated or unformed" (Pangaro, 2017, p. 1580). In conversation theory, A and B can either converse about executing a concept in regards to some practical activity they engage in, or review what has occurred as a part of that activity in order to yield a understanding or agreement as to what a concept entails; the union of which is directed towards obtaining some goal or general purpose. Pask and associates divide this conceptualisation of conversational practice into two levels of discourse: These are referred to as the "how" level and the "why" level.

The "how" level is concerned with descriptions of how to "do" a topic: How to recognize it, construct it, maintain it and so on; the "why" level is concerned with explaining or justifying what a topic means in terms of other topics. These exchanges are "provocative" in that they serve to provoke participants to construct understandings of each other's conceptions and (possibly) misconceptions of topics and the relations between them (Scott, 2011, p. 309).

In formulating a conversational language in this way, Pask and associates employ formal notation to better demarcate the divided domains of discourse. Accordingly, for any conversational language L that permits concept-sharing and concept-forming between A and B, the conversational language L shall be divided into L^0 and L^1 domains of discourse in the text. Following Pask (1975a), let L^0 of the conversational language L indicate the level of discourse concerned with employing concepts during some practical activity in order to reach a practical goal or sub-goal; whereas let L^1 be the level of discourse concerned with deriving a concept from other concepts (which might later be used to inform one's actions during some practical activity). The level of discourse L^0 then deals with the means in which participants may practically satisfy the task at hand; whereas the level of discourse L^1 deals with reflecting on some problem-solving task.

At level L^0 commands are of the form "Do something" or "Solve a problem"; questions are of the form "Give an explanation". In contrast, at level L^1 commands are of the form "Learn to solve a problem (i.e., construct a process that solves it)" and questions call for an explanation of how the process was constructed (or, sometimes, reconstructed; Pask, 1975a, p. 72).

Such levels of discourse can be said to contain topic relations R_i that exist in the conversational domain R. In speaking of a relation R_i in conversation to another participant, a participant gives a description $D(R_i)$ to their addressee. Such "descriptions" here should be conceptualised by the reader as utterances or speech acts utilised in a conversation, rather than merely referring to the kind of explanations we give of things. It follow that since the conversational

language L is stratified, then $D(R)$ are also stratified. Let $D^0(R)$ utterances be concerned with *how* we go about a task; whereas a $D^1(R)$ utterance is concerned with describing *why* one has done the task in the manner they did, or why doing the task yields a desired outcome. Following Paul Pangaro, uttering "I am thirsty" is an $D^1(R)$ utterance because it implicitly posits a goal or aim that may be articulated through other concepts as to why I am thirsty; while "I can get a glass of water" is a $D^0(R)$ utterance as it deals with the means of how that goal or aim might be achieved (Pangaro, 2019). Pask uses a diagram to represent a conversational processes between two participants. He labels this the *conversational skeleton* which is represented by Figure 1.

In Figure 1, the two rectangles on the left and right-hand sides represent the participants A and B whom are engaged in a conversation with each other. A and B are said to act according to their own individual repitiores of procedures π which is represented by the squares inside the rectangles of Figure 1. I will define a repertoire of procedures as a collection of principles, protocols, actions, knowledge, etc., that can be utilized by such participants to achieve a desired outcome in some activity. Following Nicholas Rescher and Wilfred Sellers, such repertoires of procedures π are all taken to be conceptually determined by prior conceptual content which is inferentially determined (Sellars, 1997; Rescher, 2020, p. 72).

Both repertoires of procedures π and utterances $D(R)$ are stratified along L^0 and L^1 levels of discourse. In this way, a procedure enacted in a conversation produces an utterance $D(R)$ (as represented by the circular nodes) that are concerned with the following: Either talking about the ways one might achieve a goal or aim, or explaining how one has gone about the activity in order to examine if one has achieved a goal or aim. Finally, each participant can be said to act on a modelling facility (represented by the splodge shape underneath the rectangles of Figure 1), where participants perform actions within that environment to produce conversable relations R_i. For example, cooking food to eat, building a bridge, gathering materials, or turning a tap can all be talked about by conversational participants. In the general environment, there is said to exist a specific environment which each participant interacts with. Such specific environments produce a context which that participant resides in that helps form their unique perspective. While A and B's environment may at times intersect at times, they are considerably excluded from each other's environment due to A and B being different beings with different perspectives.

Nevertheless, it is possible for participants to learn non-conversationally from each other if their environments intersect. This is done through emulating the behaviour of the other; for example, if I see someone casting a net to catch fish and I am hungry, I may attempt to emulate their behaviour in order to feed

myself. While such a behaviour can be represented as a TOTE cycle, this is different from accomplishing a TOTE cycle through the means of conversation which requires a natural prerequisite tendency to imitate and mimic other's perspectives (Tomasello, 1999, p. 30).

Figure 1

Example of a conversational skeleton
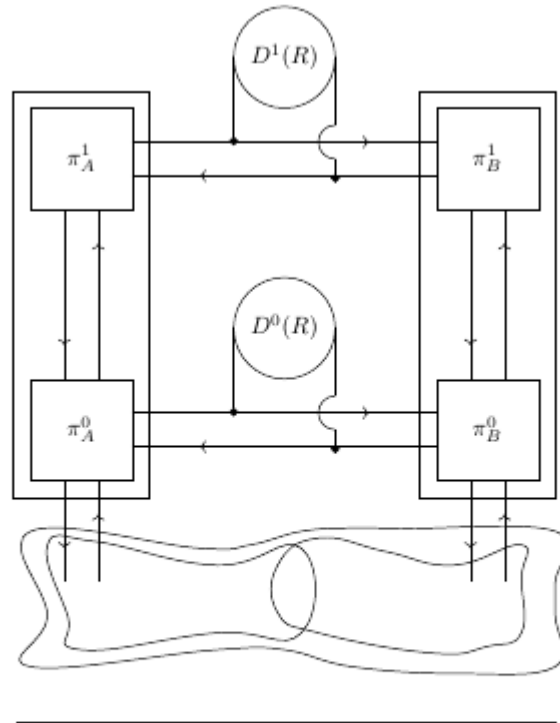
A, B	Conversational participants	D(R)	Conversational utterance
0, 1	Levels of discourse	π	Policy

Note. Depiction of the skeleton of a conversation between participants *A* and *B*. Contained within each participant are the repertoire of procedures π governing permissible interactions. Such polices are represented by the squares that exist inside a participant, which are stratified along L^0 and L^1 domains of discourse (as are utterances $D(R)$, represented by the circular nodes). The participant's modelling facility, meanwhile, is represented by the amoeba-like shapes at the bottom of the diagram. Each participant is said to exist in their own niche environmental context which is their modelling facility that may potentially overlap with another's modelling facility.

Human infants for example engage in protoconversations (Bruner, 1983; Tomasello, 1999), which "are social interactions in which the parent and infant focus their attention on one another" (Tomasello, 1999, p. 59). During protoconversations, a participant— such as a mother or father—acts *as if* the infants are engaging in an actual conversation with themselves. This involves assuming the "perspective" of the infant in question and conversing accordingly. For example, uttering "What's that?" when assuming the infant is curious about something and replying "It's such-and-such" in response, or saying "Oh, you want the toy? I'll get it for you" when the child reaches their hand out for a toy (Bruner, 1983, pp. 78-80). Bruner argued during experiments designed to study the natural language acquisition of pre-verbal infants, that the mother would respond to the child's babbles as though they *should* mean something, such that: If she could not work out what the child meant, she would prompt them again until they thought they had inferred what the child meant (Bruner, 1983, p. 83). These kinds of early protoconversations I argue, which take the form a TOTE cycle, eventually lead to the development of the conversational language L proper.

Already in a protoconversation, the kind of speech-act functions found in the conversational language L for directing attention, asking questions, providing labels, and giving feedback are already at play. This implies they are core tendencies of conversational activity which are the main modes of speech-acts which permit the giving and asking of reasons during conversational activity.

Conversation theory simplifies such speech-act functions into three requisite types for the conversational language *L*, which is done in order to express the semantic and pragmatic nature of language rather than its syntactical nature (Pask, 1975a, p. 22). These are *commands*, such as "Do R_i"; *questions* such as "What is R_i" and finally *explanations* such as "R_i is such-and-such". The union of such speech-acts is labelled the command and question language by Pask and associates (herby in this text called the command, question and explanation language) which was developed in conversation theory primarily for examining material analogies (and inferences), rather than the "truth" of "falsity" values of propositions (Pask, 1975a, p. 171). Following the division of the conversational language L into L^0 and L^1 discourse, the command, question and explanation language must therefore act along these lines.

L^0 discourse for example which utilises $D^0(R)$ utterances might use commands such as "Get me a glass of water from the tap!", questions such as "Can I get a glass of water from the tap" and explanations such as "I can get a

glass of water"; compare this to L^1 discourse which utilises $D^1(R)$ utterances, which might utilise commands such as "Tell me about your thirst!", or questions such as "Why am I thirsty?", or explanations like "I am thirsty because I haven't drank in a while", or "I managed to get some water over by the tap to relinquish my thirst". While the former form of discourse is concerned with how a task might be satisfied, the latter form of discourse is describing the situation and what can be known from reviewing the situation.

Now, I argue that the command, question and explanation language can be seen as a formal medium in which concept-sharing, concept-forming and cultural transmission can occur; because of this, utterances of the form $D(R)$ can be abstracted to model the intent embedded in such utterances during peer-to-peer interactions. Following *Logic of Commands* (Reshcer, 2020, p. 52), Pask envisages a utterance or speech-act $D(R)$ as being equivalent to the expression $< Z! \ X \mid Y >$. In this expression, the brackets "<>" represent the boundary of the contents of an utterance or speech-act; Z indicates the addressee, and X is an action; the pipe symbol "|" means "in relation to" or "given", and finally Y represents the precondition of some X (Pask, 1975b, p. 215). In layman's terms, the expression $< Z! \ X \mid Y >$ mean something along the lines of "Addressee! Do X, Given Y", or "Addressee! Bring about X, in relation to Y". The expression then can said to be a formalisation of Tomasello's idea that when we speak in conversations, we intend to bring someone's attention towards X (Tomasello, 1999, p. 102). Thus, for any utterance or speech-act $D(R)$, we can write:

$$D(R) \ = < \ Z! \ X \mid Y \ >$$

Where the letters X and Y are relations R. Now, in the command, question and explanation language we can attach one of the three modes of conversing onto the performative relation X. For example, *Comm X* would be a command to perform X; *EQuest X* would be to ask a question about X, and *Expl X* would be to explain X. Thus, asking someone to explain how one could get some water because I am thirsty would be rendered in the command, question and explanation language in the following manner:

$$D^0(R) \ = < \ Z! \ Expl^0 \ i \ (Water) \mid Thirst \ >$$

In relation to the Figure 1, each utterance or speech-act $D(R)$ can be said to enable participants to give, receive, and request information that is contained in the other participants repitiore of procedures π. I argue that the conversation skeleton can be said to provide a formal model for Vygotsky's notion of the zone of proximal development, as it provides a formal account—when paired with the command, question and explanation language—of how it is possible for peer-to-peer learning and problem-solving to exist through the means of conversation-directed activities (Vygotsky, 1978). This link between Pask's conversation skeleton and Vygotsky's zone of proximal development is not accidental in my view, as Scott argues "Throughout his writings, there is an acknowledgement by Pask of his indebtedness to the Russian psychologist Lev Vygotsky" (Scott, 2021, p. 23). This endorsement of Vygotsky's influence on conversation theory, is also found in the works of other associates whom have previously worked with Pask (Laurillard, 2002, pp. 86-87). The idea of the zone of proximal development goes like this: Assuming a participant has a sound knowledge of a topic, and that participant is tasked with learning something novel which is heavily reliant on having a good grasp of that topic, then the potential development that participant could potentially have may be enhanced through interactions with more able peers through the means of the conversational language L (Vygotsky, 1978, p. 85-86). The product of such a scaffolding procedure may be represented in conversation theory through means to the entailment mesh, which can said to be a "map of the concept" that is deliberated by two conversational participants.

3 Scaffolding and the entailment mesh

Each relation individual relation R_i that exists in either a repertoire of concepts/procedures π, or transmitted as a speech-act or utterance $D(R)$ can be said to correspond to a node that exists on what Pask calls a entailment mesh. The entailment mesh is a representative model of a concept resulting from a conversation. It is the product of two complimentary processes: The first process dealing with a person performing activities that are normatively constrained (and the products derived through performing such activities), and second process dealing with a person's ability to provide descriptions of what they have done during the activity. These two processes will be known as the *task structure* and *entailment structure* respectively.

In very simple terms then, the task structure is concerned with structuring the task at hand around a normatively appropriate framework. Examples of task structure could be flowcharts utilised for describing the appropriate course of

action to take in a safeguarding incident, a referencing style guide used in writing academic essays, a set of instructions in relation to performing an experiment, and so on. Not all task structures I argue are necessarily explicit: The kind of implicit moral frameworks and social norms we follow normatively constrain our actions when performing tasks do not have to be made explicit, because they are second nature to us. Task structures then can be said to be concerned with the ways we are entitled to act when we commit to certain standards of appropriate engagement, dealing with "all the ways a subject may legally model, depict or non-verbally explain a topic relation" (Pask, 1975a, p. 563).

Following Laurillard, conversation that occurs at the level of the task structure involves some kind of "model-building" or practical problem-solving prior to describing what one has done in that activity; something to which she finds analogous to Vygotsky's contrast between the spontaneousness of everyday concepts utilised in concrete situations, and the kind of scientistic conceptual understanding of matters found in a classroom whereby one attempts to describe and formalise the kind of practical matters and affair that occur in the world (Laurillard, 2002, p. 87). We encounter occurrences that can be said to correspond with the level of the task structure in our everyday activities. For example, a student is not entitled to present their work as their own when they have paid someone else to write their work for them, as the norms governing educational institutions requires student to commit to not gaining an unfair advantage against their peers. Likewise in mathematics, practitioners are not normally entitled to divide by zero to solve an equation as doing so results in equations becoming undefinable by virtue of being able to make any equation equal to anything. Since appropriate mathematical practice normally requires a practitioner to commitment to having a definable result (where an equation converges on some finite value or values), then we are not entitled to divide by zero. Thus, in committing ourselves to the normative domain of a particular task structure, we are entitled to results that have been derived through abiding by our commitment to that framework (and are equally not entitled to results derived from going against the norms governing that framework).

While Pask and associates did simplify the role that the normative plays in conversational practice for practical reasons as experimental philosophers, I argue that the role norms play in our practical activities were an essential consideration in Pask and associates thought. Norms then are argued here to govern permissible actions and their outputs, which may be expressed as a task structure; these outputs produced at the level of the task structure, can then be described in such a way to construct, or reconstruct a concept at the level of the

entailment structure (traditionally represented as pruned of task structure inferences; Pask, 1975a, p. 555). In this way, discourse corresponding to a task structure corresponds to $D^0(R)$ node on the conversation skeleton by virtue of trying to achieve some practical result in one's non-conversational environment (Pask, 1975a, p. 76). Likewise, discourse corresponding to a entailment structure corresponds to a $D^1(R)$ node on a conversational skeleton by virtue of describing what one has done or what a result means in relation to the original purpose of the task. The result of these two processes, yields the head node R_H in a way that corresponds to a TOTE cycle and the type of inferential accounts offered by Brandom, Sellers and others related to the Pittsburgh School of Philosophy. A diagram of this process in represented in Figure 2.

Figure 2

Example of a entailment mesh
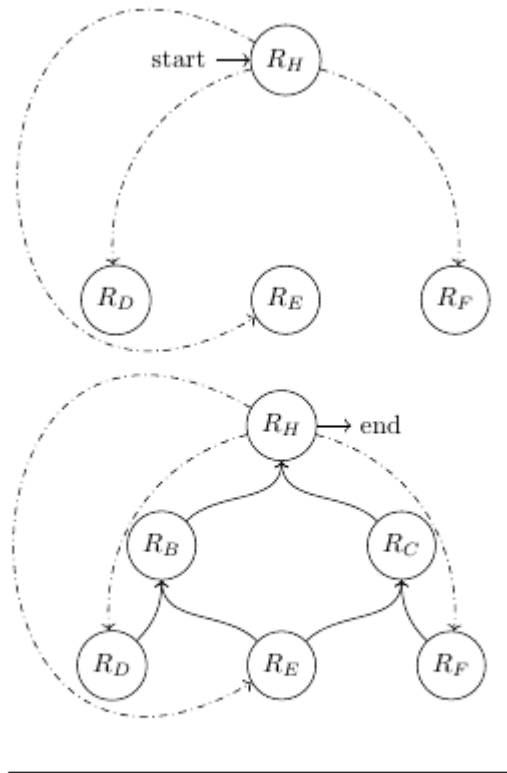
Note. Example of the two stages of an entailment mesh. The top panel shows how enacting a task structure on R_H yields relations R_i, whereas the bottom panel shows how giving descriptions in an entailment structure synthetises the necessary relations to yield R_H.

To conclude this section, we are able to represent a concept as an inferential TOTE cycle through the means of an entailment mesh. Each relation R_i in that entailment mesh can be said to correspond to a $D^1(R)$ utterance as represented in the skeleton of a conversation (see Figure 2; Pask, 1975a, p. 555). In order to yield such relations that are to be described in such a way as to yield a concept, prior practical engagements at the level of the task structure must take place which would utilise $D^0(R)$ utterances in coordinating activities partaken at the level of a task structure. From the outputs from such a task structure, may be described in such a way that we are able to understand how those outputs in order to yield a conception R_H which we can add to our repertoire of concepts π.

4   Concepts, Memories and Perspectives

The final part of conversation theory that shall be discussed here is the notion of M-individuals and P-individuals, as well as how P-individuals manifests through concepts, memories, and conceptual activity. It is worth distinguishing M-individuals and P-individuals before examining how P-individuals emerge. M-individual stands for mechanical individual, which are interpreted as systems, processors or "hardware" that led to the emergence of P-individuals. The brain and central nervous system for example, are M-individuals which lead to the emergence of the P-individual of human beings. Extensions of the brain/body system, such as pencils, bicycles, mobile phones are also considered to be a part of M-individuals (Scott, 2021, p. 25). M-individuals can be said to be reproduced based on biological or physical laws, which determine what underlying fabric or medium can or can't do (Scott, 2021, p. 24), rather than being concerned with "symbol manipulating processes" (Pask, 1975a, p. 166). Now, M-individuals allow for the embodiment of P-individuals which stands for psychological individuals; in a sense, M-individuals create the requisite conditions which allow P-individuals to become embodied in the world. The term P-individual is used specifically to separate "a coherent cognitive organisation or stable class of procedures" (Pask, 1975a, p. 166) which P-individuals are, from the actual processors by which such procedures are executed, i.e., M-individuals. Examples of P-individuals could include the following:

A role in society (realised by any of a class of human beings); A character in a play (realised by any competent actor on a stage); A species (realised by any member organism; Pask, 1975a, p. 166)

This list is illustrative, but not exhaustive of the different type of P-individuals. Now, I argue following Pangaro (2019) that a P-individual can be considered to be equivalent to a perspective one can take rather than a fixed "inner self". According to R. D. Laing, these kinds of perspectives arise from either the expectations or intentions of others onto ourselves, or the perceived expectations or intentions we think others place onto ourselves (Laing, 1960, p. 98); this requires us to take the perspective we purport them to have in regards to ourselves. Viewed in this way, P-individuals are said to have an inherently social and conceptual character within conversation theory. Following the adage that "one cannot not conceptualise" (Scott, 2021, p. 26), since P-individuals such as you or I are conceptuality constituted by concepts that fall back on themselves in a cyclic fashion, we cannot do anything other than conceptualise because by its very nature conceptualising conserves concepts—there is organisational closure. Pask formally defines the inherent conceptual character of P-individuals through the following expressions, where the notation *Rep* refers to reproduction and *Z* is a participant:

$$Conc_Z \, i \, (R_i) \, \triangleq \, Rep_Z^0(R_i)$$

This first expression says something along the lines of "Z's concept of a particular relation is substitutable by definition to the reproduction of that relation in some norm governed practical activity". The notion of memory rests on this notion:

$$Memory_Z \, i \, (R_i) \, \triangleq \, Rep_Z^1[Rep_Z^0(R_i)]$$

Which can be interpreted as saying "Z's memory is substitutable by definition to the reproduction of a description or account of the concept $Rep^0(R_i)$". The final expression is as follows:

$$P - Individual \triangleq Rep[Memories_Z(R_1, R_2, R_3, \ldots, R_n)]$$

Such that, "A P-individual is substitutable by definition to the reproduction of a series of memories", which themselves exist through the reproduction of concepts. While the above expression is slightly modified from Pask and associates original expressions (Pask, 1975a, p. 196), the expression above nonetheless are able to infer the conceptual nature of P-individuals. It is worth emphasizing here that there are many different types of P-individuals, which are all the products of discursive conversational activity. Such interpersonal interactions between different P-individuals can be said to have aided in the development of cognition and thinking in humans (Laing et al., 1964, p. 41):

> The unitary P Individual may be a mind inhabiting one brain; a social organisation, inhabiting several brains or several individuals, coexisting in one brain; for example, the case of "learning alone" (which is viewed as a dialogue between distinct P Individuals "learner" and "teacher" executed in the same brain) (Pask, 1975a, p. 403)

What I particularly believe is of note here for the reader, is the idea that it is possible to have *several different perspectives conversing in one and the same mind*. What we call consciousness in conversation theory, consists in multiple conversing P-individuals whose interaction recursively form the conscious of an individual human being. This does not mean the individual has dissociative personality disorder, suffering some state of psychosis, or some other notable psychological condition. Instead, consciousness can be said in the context of conversation theory to be a dynamic interaction of varying embodied perspectives engaging in a conversation with each other throughout ourselves, which enables a reasoning process to emerge in an individual person through the result of this conversation between different perspectives (all of which could be potentially represented recursively via a conversation skeleton). The actualisation of consciousness and the discursive realm of conceptual activity then in conversation theory, can be described as a series of fragmented and sporadic interactions which occur on multiple recursive levels of interactions via conceptually manifested entities (Laing, 1967, p. 19). Many P-individuals (in particular the perspectives inside ourselves) can be likened to apparitions, who flicker in and out of existence depending on the situation. Thus, I argue conversation theory seems to permit the conception of there being no fixed self;

instead, what we call an individual self is the result of the conversation had between different P-individuals which are conceptually defined and evanescent.

5   Conclusion

Conversation theory then is a theory describing the relation to concept-sharing and concept-forming through conversation. Conversation, being a particular mode of communication in which we give commands, ask questions and provide explications to one another. It is a mode which permits the giving and asking of reasons between peers in conversation theory, which I have argued is a distant relation of contemporary inferential semantics. In forming concepts, we also form perspectives or P-individuals which themselves engage in conversational activity. P-individuals in conversation theory are recursively entities, which can manifest as inner critics, "individual" persons, cultures, academic disciplines, nations states, and so on. Yet such P-individuals are embodied in M-individual architecture (such as a brain, cellular organisms, molecules, and so on). Conversational activity in conversation theory has been described as TOTE like in its behaviour, and can be represented through the skeleton of a conversation. The products of such conversational activity are the individual relations R_i which can be represented through means of an entailment mesh, which has been conceived by myself as a kind of inferential assemblage that Pask, Scott, and others have viewed as a map like structure detailing conceptual coordinates. I have made the argument in this text that because Pask and associates were primarily concerned with problem-solving in educational contexts, conversation theory has not sufficiently examined the role of the emergence of normative practices through means of conversation. Nonetheless, both the contemporary inferential semantics of the Pittsburgh School of Philosophy which argues for a normative pragmatic conception of discursive practice, and the cybernetic and pedagogical conception of conversation as articulated in conversation theory have been argued in this text to be amicable to each other. Both myself and Scott see "the role of conversation theory and cybernetic thought, generally, in the future developments of information technology" (Scott, 2021, p. 134). For this and other reasons, I passionately believe in the ability of conversation theory to aid in the development in a myriad of fields, and that the extent to which it can be applied has not yet been realised. Much of its lack of appreciation in wider academic circles I believe are the results of its general inaccessibility and growing obscureness, which has hindered such applications. Therefore, I have felt it necessary in this text to

give the reader an account of what conversation theory is, through explaining how its core parts integrate to form a theory of conversational and discursive activity. In doing so, I hope to make it easier to create the conditions necessary to foster such practical applications and create a wider dialogue with other academic practitioners interested in the subject in future.

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