Towards a General Theory of Perspective Taking: A Transdisciplinary Endeavor

Kristian Stålne

Department of Materials Science and Applied Mathematics Faculty of Technology and Society Malmö University, Malmö, Sweden

Abstract:*Perspective taking is emphasized by several developmental theorists as a basic aspect of human development, although it hasn't been properly defined beyond the conventional stages and 3rd person perspective. The aim of this analysis, that adheres to Nicolescu's three axioms of the methodology of transdisciplinarity, is to present a general theory of perspective taking, introduce six orders of perspective taking and apply them to the psychological, relational, and physical aspects of reality. The analysis is formulated from principles of adult development and compared with stage descriptions of social perspective taking according to Selman, children's understanding of space according to Piaget and Inhelder and stage descriptions from ego development theory by Cook-Greuter. This theoretical formulation of perspective taking allows for generalization into an understanding of physical reality according to 4th and 5th person perspectives with examples in Einstein's theory of special and general relativity and quantum mechanics, according to Bohr.*

Keywords:Adult development, perspective taking, stage theories, subject-object relation, meaning making, ego development, transdisciplinarity, quantum mechanics, general and special relativity.

1   Introduction

Perspective taking can be understood as seeing a situation or understanding a concept from another's point of view (see e.g. Flavell, 1992) or in terms of social perspective taking as the developmental ability to "...put one self in the place of another person and to make inferences concerning the other's capabilities, attributes, expectations, feelings, and potential reactions" (Light, 1979). It may also involve seeking and understanding how different viewpoints relate to each other (Andree, 2022; Fuhs, 2016). Perspective taking has attracted attention as a core competence in relation to different frameworks, such as the Global competence framework (Mansilla et al., 2013; PISA, 2018) or the Inner Development Goals (2022). It can be seen as an essential part of developing empathy, cooperation and socialization (Tomasello, 2009), as well as the development of moral judgment (Kohlberg, 1969). Perspective taking, as in seeing oneself through the eyes of the other, is also argued to be necessary for self-consciousness to arise (Mead, 1934). Tom Hagström (2023) argues for perspective taking, described as subject-object balance, as a basic aspect of human development and meaning making. Perspective taking is foundational to our cognition since it sets the boundaries of what we perceive and can understand, both in physical reality as well as psychological

and social realities. Seeing or experiencing a world is always done from a certain perspective and it is, thus, relevant to further investigate what perspective taking is and how it develops.

The term perspective originated from medieval Latin and was constructed from the roots *per*, through, and *spek*, to observe, meaning to examine something closely, and was then used to describe the science of optics. In the late 16th century, the term was associated with the use of perspectives in Renaissance Italy, "prospettiva" (Etymonline, n.d.), as the art of projecting three-dimensional objects and depth on a two-dimensional canvas was developed (Hill, 2020). Generally, we recognize only a 1st, 2nd and 3rd person perspective, but higher order perspective taking has been introduced and discussed in various contexts. A 4th person perspective and higher orders are introduced in ego development theory, as will be introduced later, and in the context of action research, according to Otto Scharmer and Eva Pomeroy (2024). This was based on a qualitative method that yielded a number of themes that the authors argued to reach beyond 1st, 2nd and 3rd person perspectives. This approach did, however, not offer any theoretical underpinning on which one could build on to a 5th person perspective and onwards.

Perspective taking is also seen as a, if not the, fundamental dimension of development according to Ken Wilber's AQAL framework and view on post-metaphysics (Wilber, 1996). Perspective is given by the quadrant through which one views reality. This way, Wilber aimed at covering not only psychological and social realities but also the natural world of physical objects and systems. He started to develop a mathematical notation for perspectives denoted 'integral mathematics of primordial perspectives', which, combined with altitude (level or stage of development), constituted what he referred to as the 'cosmic address' of what is being considered (Wilber, 2007). He understood perspective to be fundamental in the sense that we cannot separate the subject from the object, what is being known from how it is seen, and the epistemological and ontological realm. This approach took perspective taking in its broadest sense and ordering levels of development accordingly up to the 7th person perspective, but without clearly defining what a perspective is. Wilber's take on perspective taking was, in essence, based on a developmental and evolutionary view, which is also the approach argued for in this article, as will be further outlined.

Perspective taking and the subject-object relation is also highly relevant and recognized within complex problem solving that requires collective and transdisciplinary approaches (Stålne & Pedersen, 2021) and for transdisciplinarity in general (Nicolescu, 2010). The concept of transdisciplinarity is often attributed to Jean Piaget, André Lichnerowicz and Erich Jantsch, who called for structures and systems of disciplines to be applied in education (Augsburg, 2014). Basarab Nicolescu developed the following definition: "Transdisciplinarity concerns that which is at once between the disciplines, across the different disciplines, and beyond all disciplines. Its goal is the understanding of the present world, of which one of the imperatives is the unity of knowledge" (Nicolescu, 2002, p. 44). In the process of establishing an appropriate definition, Nicolescu (2010) argued from his experiences in quantum mechanics for a view of transdisciplinarity as beyond disciplinary boundaries that was incomplete in a Gödelian sense and emphasized the critical subject-object interaction in this quest: "For me, "beyond disciplines" precisely signifies the Subject, and, more precisely, the Subject-Object interaction. The transcendence inherent in transdisciplinarity is the transcendence of the Subject. The Subject cannot be captured in a disciplinary camp" (Nicolescu, 2010, p. 19). This is in agreement with the view of quantum physicist Werner Heisenberg, whom Nicolescu quotes:

> The concept of 'objective and 'subjective,' designate[s] two different aspects of one reality; however we would make a very crude simplification if we want to divide the world in[to] one objective reality and one subjective reality. Many rigidities of the philosophy of the last centuries are born by this black and white view of the world. (**Nicolescu, 2010, p. 19**)

Nicolescu arrived at the following three axioms of the methodology of transdisciplinarity: The ontological axiom, which recognizes levels of reality of the object and corresponding levels of the subject; The logical axiom, which emphasizes the included middle and a hidden third region between or transcending subject and object; The complexity axiom, that sees the world as interconnected, even across levels of reality. These axioms will be relevant to the proposed analysis and proposed theory of perspective taking and will be reviewed later in the discussion.

1.1   Perspective Taking in Developmental Psychology Research

In developmental psychology, which involves the study of the individual's development, or ontogeny, perspective taking can be articulated as a cognitive skill or awareness that develops from unawareness and embeddedness to an ability to step out of one's frames and perspective and see how others see the world along with an increasing awareness that we always see the world through some perspective (see, e.g. Kegan, 1982).

The first to systematically investigate the cognitive development of children was Jean Piaget, who demonstrated that the ability is not a given but is rather something that children develop. Piaget and Bärbel Inhelder (1970) demonstrated children's varying degrees of perspective taking with tests such as 'the three mountain problem', where the subjects were exposed to a model of three mountains of different sizes with different objects on them. The task was to imagine and state what can be seen from different perspectives or vantage points from the mountains. Children at the preoperational stage, typically under six years of age, typically failed to imagine the mountains from other vantage points than their own. This is also referred to as egocentric thinking, where the child assumes that everyone else sees, feels and hears exactly the same as the child. Children evaluated at the following concrete operational stage were able to correctly state what a doll sitting across the table should be seeing – and not seeing if, for instance, a tree should be blocked by one of the mountains from the doll's perspective, although it was visible by the child.

Piaget also investigated development in the social domain and studied how children related to moral and social interactions (Piaget, 1965). He distinguished between heteronomous morality, where the child would adhere to its own impulses or follow rules and norms imposed from the outside, and autonomous morality, where one formulates a morality by oneself. The shift from heteronomous to autonomous morality, Piaget argued, would happen around age nine or ten while fully leaving the egocentric preoperational stage.

Piaget's work on cognitive and social development was expanded into different directions and into adult life. Lawrence Kohlberg (1979) famously developed his theory of moral development, where subjects were exposed to moral dilemmas and ordered ways of responding and positioning into six stages reaching into adult life. Piaget's and Kohlberg's combined efforts then diverged into several directions, one focusing on complex thinking in Michael Commons' model of hierarchical complexity, MHC, and another on social perspective taking in the work of Robert Selman (1980). Both of these directions addressed the issue of finding a developmental aspect or dimension that was underlying, more foundational and basic than moral reasoning.

Selman's approach was to see the social perspective taking as foundational and tried to differentiate this from complex reasoning, which is challenging both from a theoretical point of view and in designing tests: "...social cognition cannot be reduced, theoretically or practically, to just the simple application of cognitive skills (structure) to the social sphere (content)" (Selman, 1980, p. 14), an approach that is reflected in this analysis as well. Selman and colleagues attempted to design games that the children would approach with different levels of perspective taking, from only considering one's own objective of reaching a certain goal to also taking into consideration the opponent's attempts to defend and of reaching his or her goal. They illustrated the distinction between perspective taking and complex thinking by ranking different games in relation to the two dimensions. Chess was considered to emphasize primarily complex thinking since it requires a significant understanding of the rules and being able to calculate several moves ahead rather than considering the opponent's intentions. In poker, on the other hand, taking the opponents' perspectives was considered more important, where the possibility of bluffing is much higher since the cards on your hand are hidden from the opponent. This line of argument guided their attempts to find tests that focused on perspective taking, although the two dimensions may be entirely inseparable.

Selman and colleagues chose to primarily apply interviews around different social topics as a way of measuring perspective taking in a similar way as in Kohlberg's research, despite the time-consuming effort of building up a scoring manual for each topic. Topics investigated focused on domains such as the view of individuals and self-awareness, friendship and resolving conflicts, leadership among peer groups, and punishment in parent-child relations. Based on the common patterns over responses from these domains, five stages of social perspective taking were formulated where the children gradually learn to take another

person's perspective and then move further to see a perspective of a generalized other, or 3rd person perspective. The theoretical approach was rooted in the work of Baldwin, Mead and Piaget:

> "In our interest in levels of development that satisfy the essential stage criteria of structured wholeness, invariant sequence, and universality, our work is an outgrowth of the Piagetian tradition. Our approach is also clearly Piagetian in its focus on the form of thinking and the relation of expressed thought to underlying cognitive structures rather than on affectivity or individual or group differences" (**Selman, 1980, p. 23**).

A consequence of the development of perspective taking is a deepening understanding of oneself and other person's psychological functioning and motives. The concepts of relations are also understood in more complex ways, from an egocentric and concrete view of relations with other individuals to an ability to consider reciprocity between peers and further include societal perspectives and collectives as abstract entities. The highest stage formulated by Selman and colleagues corresponded to the late conventional (conscientious or achiever) stage of ego development, roughly corresponding to full formal operational in Piaget's theory. This framework will be central to this analysis and will be further outlined in a later section.

1.2   Perspective Taking in Adult Developmental Psychology Research

The research field of adult development psychology engages in further development in adult life, beyond Piaget's formal logical thought in different directions. This is commonly referred to as post-formal (Commons & Ross, 2008; Sinnott, 2003) or post-conventional thinking (Cook-Greuter, 1999; Kohlberg, 1979; Pfaffenberger et al., 2011). A common division among the stage-based approaches is between those engaging in the development of the domain of complex thinking (Basseches, 1984; Commons, 2008; Dawson et al., 2003; Fischer & Bidell, 2006) and the more holistic approaches of investigating meaning making (Kegan, 1982, 1994) and ego development theory (Loevinger, 1998; O'Fallon et al., 2020).

A common argument from the theorists engaging in complex thinking is that these theories are more foundational and basic than the domain-specific theories, such as Kohlberg's (Hagström & Stålne, 2015). One such theory is the model of hierarchical complexity, MHC, which was developed into a formal theory, currently with 17 analytically derived orders of hierarchical complexity (Commons, 2008). From this theory, the stage of performance of an individual can be evaluated by means of a structured test, e.g. the Laundry test, that measures up to the metasystematic order by interviewing and evaluating with the the scoring manual, the Hierarchical Complexity Scoring System (HCSS) (Commons et al., 2005). Stage of development refers to the act of internally ordering information appropriately to solve a particular task at hand. MHC can be considered general and basic in that it has been applied in domains spanning the inner and social life to the material world of the natural sciences (Stålne et al., 2014). From an MHC perspective, Kohlberg's model can be understood as describing complex reasoning within the domain of moral dilemmas. A key concern with these approaches is whether perspective taking can be reduced to and assimilated into complex reasoning and theories for complex thinking, which is here argued not to be the case.

Two approaches that built on Selman's model and formulated higher stages can be mentioned in work by Cheryl Armon (1984), who studied how ideas of a good life develop, and Joseph Anthony Rodriguez (1992), who studied perspective taking in relation to informed consent. Both these approaches did, however, not clearly differentiate between complex reasoning and perspective taking, and they did only consider social and psychological aspects and not the physical world. Two recent dissertation works by Clinton Fuhs (2016) and Rebecca Andree (2022) addressed perspective taking and broadened its scope to perspective action consisting of perspective taking, seeking and coordinating, where all of which were elaborations into a number of sub-skills. Fuhs related perspective taking skill with the level of complex thinking and pointed out a common circularity in how perspective taking is related to developmental level in a broader sense, e.g. in terms of ego development, without clarifying or defining what perspective taking is, other than expressing it as the type of perspective you typically take at the developmental level.

Robert Kegan further developed the view on perspective taking by bridging the social dimension and physical world in his subject-object theory (Kegan, 1982, 1994). He argued that perspective taking could be understood as a relation or balance between a subject, that which is viewing, and an object, that which is being viewed, and that this balance is central to our way of making meaning of the world. Focusing more on the processual aspects of balance and movement rather than on the statically described stages or orders of development, Kegan demonstrated how our ability to take perspective develops by making the subject into an object of awareness and thus stepping out of embeddedness. He argued that meaning making, or subject-object balance, is more fundamental than social perspective taking according to Selman's view. Here, he also broadened the scope of meaning making by referencing the Piagetian framework that contains three relationships: a biological one between organism and environment, a psychological one between self and others, and a philosophical one between subject and object (Kegan, 1982). The biological relationship that captures the organism's adaptation to its environment is, after this, not further elaborated by Kegan, who only references Piaget's highest formal operational stage of development. Thus, in practical terms, Kegan only considered the psychological and social aspects of reality in his descriptions of perspective taking and meaning making and did not consider, e.g. how the physical world would be experienced from his highest, 5th order meaning making. Although perspective taking by nature is social, it may also provide information about the non-social and physical reality.

Taking inspiration from the previously mentioned Wilber, Terri O'Fallon (Murray & O'Fallon, 2020; O'Fallon, 2020) applied the ordering perspectives, from 1st, 2nd and 3rd person perspectives and onwards, as a theoretical frame to the ego development theory developed by Jane Loevinger. Loevinger built ego development theory from a purely psychometric perspective utilizing the measurement instrument Washington University Sentence Completion Test (WUSCT) (Hy & Loevinger, 1996), and formulated stages based inductively on the clustering of responses, similar to Selman, thus refraining from formulating any underlying theory. "Ego" in ego development theory was described as the self's search for coherence and comprised aspects such as perspective taking, context awareness and complex thinking. Loevinger's empirical and psychometric approach to ego development was accompanied by a skepticism towards any attempt to find an underlying logic to describe the stages.

Nevertheless, Susanne Cook-Greuter (1999) continued Loevinger's work and argued for underlying patterns in differentiation and integration between every other stage, and introduced illustrated perspectives that were underlying the stage progression. O'Fallon's version of ego development theory, denoted the Stages theory, placed perspective taking at the core in the description of stages of ego development, thus aiming for it to qualify as a hard stage theory, although still with no explicit definition of perspective taking or description of what, for instance, a 4th person perspective is.

It may thus be concluded that perspective taking is considered by several theories and researchers to be relevant and even foundational to describing human development. This was also argued by Tom Hagström (2023), who placed perspective taking, expressed as subject-object duality, as one of four basic dimensions to describe inner development and specifically meaning making. The other three were the dualities of self-other (a psychological dealing with identity), inner-outer (relating to the environment dealing with action and adaptation), and cause-effect (dealing with complex thinking, structuring information and problem solving). Hagström took a departure from Kegan's subject-object theory and references to the Piagetian framework and Commons' MHC to define meaning making as well as the agent that is engaged in the meaning making. In research on perspective taking, Selman seems to be the one who goes the furthest in defining what social perspective taking is – and what it is not by distinguishing it from complex thinking.

It should be noted that neither Kegan nor Selman continues Piaget's and Inhelder's work on exploring how perspective taking on physical reality can develop beyond the formal operational stage, which corresponds to an objective, fixed-reference, and Newtonian perspective on the world. This way of objectively perceiving the world, according to Piaget's formal operational stage, has been the norm of Western societies, although more complex ways of relating to physical reality have been discussed due to advances in general relativity and quantum mechanics for more than a century. At this point, there is no general theory for perspective taking that can be applied across domains or aspects of reality similar to MHC.

2 Methodology

The aim of this analysis is to conceptualize perspective taking from a theoretical point of view by succinctly defining what it means to take a perspective, how perspective taking develops in terms of six orders, from 1st to 6th person perspective, and what the different perspectives reveal about the different aspects of reality: the psychological, the relational and the physical. This would enable an identification of gaps in the descriptions of how physical reality is seen from post-conventional and post-autonomous perspectives. Elucidating and defining perspective taking would also contribute to the work of identifying other basic dimensions of ego development and inner development in general.

2.1 Research Approach

The approach of the analysis is to hypothesize general orders of perspective taking based on existing principles from the field of adult development and then test them by comparing with the descriptions of three different stage-based theories; namely, Selman's work on social perspective taking (1980), ego development theory according to Cook-Greuter (2013) and Piaget and Inhelder's work on the child's conception of space (Piaget & Inhelder, 1970). Although Cook-Greuter's report is an unpublished manuscript, it is here considered the prime source for describing the higher stages according to ego development theory due to Cook-Greuter's extensive experience with WUSCT scoring and authority in the field. Selman's work focuses solely on social perspective taking of the relational and psychological world, but from the other sources, the perspective taking dimension needs to be elucidated and extracted from other development dimensions. The descriptions of the respective orders of perspective taking, up to the 5th person perspective, will be compared with first Selman's and Piaget's work as the main sources and then following with ego development theory according to Cook-Greuter, see Table 1. The descriptions capture conceptions of the psychological, relational and physical reality or state the lack of such descriptions. The presentation of orders will be organized according to the nth person perspective, which is the object of study in this investigation. In the 2nd to 5th person perspectives, the description will be divided into an earlier and later phase reflecting results from two stages of social perspective taking (Selman) and ego development theory. Thus, the description of the orders of perspective taking can be seen as being more coarse-grained than other adult theories such as ego development theory, Selman's theory of social perspective taking or MHC.

Table 1: Overview of sources to the evaluation of orders of perspective taking.

Orders of perspective taking	Psychological	Relational	Physical
1st person perspective	-		-
	Selman: level 0		Piaget: preoperational
2nd person perspective	Selman: level 1		Piaget: concrete operational
	Selman: level 2		
3rd person perspective	Selman: level 3		Piaget: formal operational
	Selman: level 4		
4th person perspective	Cook-Greuter: Individualist/Self-questioning/Pluralist		-
	Cook-Greuter: Strategist /Self-actualizing/Autonomous		
5th person perspective	Cook-Greuter: Construct-aware/Ego-aware		-
6th person perspective	Cook-Greuter: Unitive		-

The description of the orders of perspective taking is organized according to three dimensions or aspects of reality inspired by Selman's description of social perspective taking: the psychological, from Selman's description of "Concepts of Persons", the relational, from Selman's "Concepts of Relations" and where

physical reality has been added based on the work by Piaget and Inhelder. The choice of dimensions is primarily based on the descriptions available from the sources, although it is also recognized as a common way of dividing reality, for instance, in the biopsychosocial medical model (Engel, 1977) and represented in the four quadrants of the AQAL framework by Wilber (1996) (merging the two lower quadrants).

Thus, stage descriptions from these theories become the empirical data for the theory of perspective taking in a similar way that several development and adult development theories became the empirical data for the model of hierarchical complexity, which is considered a general stage theory for complex reasoning or way of organizing information in different domains. The definitions aim to capture the essence of perspective taking at the respective orders in understanding psychological and social reality so that they may be generalized to the understanding of physical reality. The absence of descriptions of perspective on the physical reality is a rationale for the study in question and the aim of formulating a theory of perspective taking that is general across all dimensions of reality. After testing the theoretical description by comparing them with existing theories, the theory will then be applied to physical reality to formulate possible views of physical reality from a 4th and a 5th person perspective.

2.2 Guiding Assumptions

In the development of ego development theory, several assumptions have been made regarding underlying patterns that will be applied here. The first assumption is that the description proposed by Cook-Greuter and O'Fallon, in 1st, 2nd person perspectives etc., is a meaningful way of describing the development orders in perspective taking. The analysis will encompass the 6th person perspective, although the last postulated perspective will not be compared due to its very limited descriptions. A second assumption, proposed by Cook-Greuter and O'Fallon, is that the development of perspective taking corresponds to stages of ego development theory in a way that one stage of perspective taking, e.g. 3rd person perspective, encompasses two stages of ego development (Expert and Achiever). A third assumption is that the perspectives come in pairs so that the shifts from the 2nd to the 3rd and from the 4th to the 5th person perspective are more fundamental than from the 1st to the 2nd and the 3rd person to the 4th person perspective. This can be expressed as perspectives come, in O'Fallon's terms, in tiers of two. Kegan's notion of stepping out of embeddedness will be recognized in the transition from odd to even perspective (1st to 2nd and 3rd to 4th etc).

The outlined development of perspective taking will also follow the hard stage criteria. According to Kohlberg and Armon (1984), there are several criteria for a development theory to be considered as a hard stage theory: this entails a total shift and transformation in the subject's thinking and meaning making and can be captured in different basic assumptions: a qualitative difference between the stages, an invariance and irreversibility in the development sequence, a structured wholeness across a range of concepts and a hierarchical integration so that a new stage included the previous ones. This will also be considered as guiding assumptions in the following approach.

2.3 Hypothesis: A General Theory for Perspective Taking

Here follows a proposed succinct definition of perspective taking and the six orders of perspective taking that are illustrated in Figure 1. These definitions are intended to capture the essence of each order of perspective taking but will, by necessity, reduce the complexity and nuances of the respective descriptions offered by the researchers in question. This is necessary to be able to generalize from the psychological and relational into the physical domain. Further, more succinct definitions will make perspective taking easier, e.g. in taking 4th or 5th person perspectives on different phenomena or aspects of reality. The definitions will be further elaborated in the following text.

Perspective taking is conceptualized as the relation between a subject and an object that specifies what one can experience from a certain perspective (the object) along with the way one experiences the world (the subject).
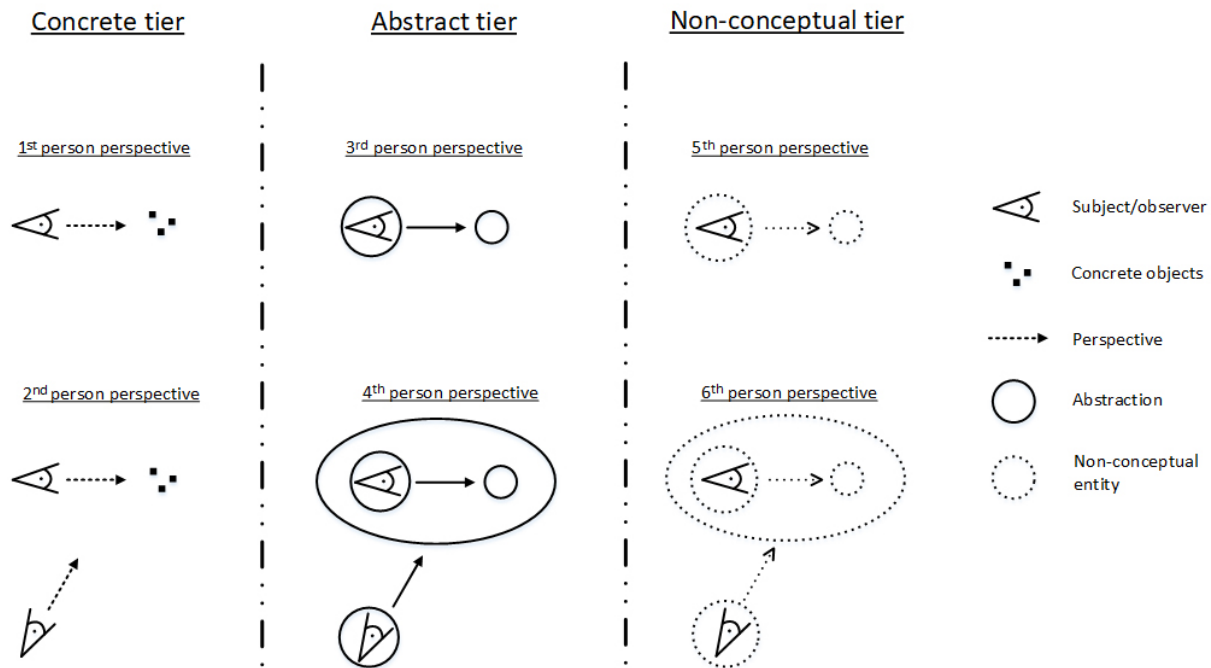
Figure 1: Illustrations of the six orders of perspective taking organized into three tiers.

1st person perspective means seeing the concrete physical reality of things and matter by utilizing the five senses, where no social involvement is present.

2nd person perspective means seeing reality through another concrete person's eyes while also recognizing what cannot be seen from that position. It focuses on the concrete world but also opens an inner, psychological reality.

3rd person perspective means taking the abstract perspective of a generalized other and, from that, visualizing and understanding reality in abstract terms. An inner world, as well as relations and collectives, can be recognized as abstract entities.

4th person perspective means recognizing the relation between a certain view of reality and the abstract interpretation of it due to underlying assumptions of frameworks or outlooks. It can acknowledge what cannot be seen from the respective abstract perspective.

5th person perspective means to take the subject-object relation and other non-conceptual entities as objects of awareness by means of intuition. Patterns or phenomena that manifest across the division of subject and object can be recognized.

6th person perspective means to recognize the embeddedness in the non-conceptual entities that one applies in seeing the same.

The symbols of Figure 1 illustrate a pattern of first being able to directly perceive reality in terms of concrete, abstract or non-conceptual objects or entities (1st, 3rd and 5th person perspective, respectively) and then being able to take a perspective on the previous way of perceiving reality (2nd, 4th and 6th person perspective, respectively). The shift from odd to even orders of perspective taking takes place within a tier and is characterized by a "stepping out of embeddedness", whereas a shift from even to odd orders marks a shift between tiers. Thus, the development of perspective taking demonstrates a common developmental characteristic of differentiation and integration (Basseches & Mascolo, 2009).

The pattern in the development of perspective taking repeating itself throughout different larger tiers is also reflected in the view of ego development theory that O'Fallon (2020) proposes. The first tier refers to taking perspective on the concrete aspects of reality, which comprises the 1st and 2nd person perspectives. From the 1st person perspective, the world is seen "as it is" and the 2nd person perspective allows for seeing reality from another person's eyes and being aware of the differences between the world and the perspective of the world. As Kegan states, rather than being embedded in the perspective, the perspective can here be taken as an object (although the perspective is understood in concrete terms as what one sees from a certain position in the room). The first tier is followed by the second tier, which deals with abstract objects and concepts. The assumption made in this analysis is that a similar pattern is present in the relation between the 3rd and the 4st person perspectives as between the 1st and 2nd person perspectives. Thus, the 4th person perspective means recognizing the embeddedness of trying to understand reality in abstract terms and seeing the relationship between reality and the assumptions and conditioning that underlie the abstract interpretation of it, albeit still in abstract terms. The first tier of perspective taking, comprising 1st and 2st person perspective, is here denoted the concrete tier and the second tier, comprising 3rd and 4th person perspective, is denoted the abstract tier, since it deals with abstractions, in parallel to Fischer skill theory (Fischer & Bidell, 2006).

Assuming this pattern to be accurate, we can conclude that an outcome of a 4th person perspective is an understanding that an objective perspective, or the perspective from a generalized other or a certain theoretical frame, is just a perspective on the world rather than a correct and accurate representation of it. Thus, one can take abstract perspective taking as an object and understand it as the relation between the theory's assumptions and abstract vantage point and the appearance of the object of study. It would state the observation as "if you apply this theoretical lens, then you see the world this way" in a similar way as the 2nd person perspective's "if you stand over there, you will see this" as demonstrated in Piaget's and Inhelder's 'three mountain problem'. The symmetry between the first and second tier can also be reflected in the many concrete analogies we use in everyday life to illustrate abstract principles and phenomena, such as describing the optimization of unnecessary components in systems thinking by "rearranging the chairs on the Titanic" or illustrating the application of models or methods beyond their domain of validity as "If all you have is a hammer, all problems will appear as nails".

The 4th person perspective also implies a processual and recursive nature of introspection. As one tries to see oneself, one is both subject and object so that one only can see the parts of oneself that can be taken as an object. Since this self-understanding is also based on an interpretation that, in turn, can be examined, the regress and processual aspects will follow consequently. This processual dynamic is also central in the subject-object theory (Kegan, 1982), where the relation between the object, what can be seen, and the subject, which is seeing and making meaning, is expressed in terms of a balance given by the extent one can take the inner world as an object. According to the subject-object theory, identification and role-taking are intimately intertwined with the subject-object balance. Here, perspective taking is only considered as an ability to see different aspects of reality, i.e., only addressing epistemological concerns, although it by necessity involves a subject, which in turn involves some sort of identification. It should also be noted that the post-conventional stages, in their recognition of the limitations of formal logical thought, emphasize bodily and emotional aspects of relating to the world, although it is the cognitive aspects that are highlighted in this view of perspective taking.

The 5th person perspective takes as its object of awareness non-conceptual entities and phenomena, such as the subject-object duality itself. Phenomena or patterns that can be observed in both the inner and outer reality may include systems that undergo transformations or demonstrate fractal properties. Other examples of phenomena that transcend the subject-object boundary are archetypes in terms of psychological patterns (Jung, 1959) or common structures to stories (Campbell, 2008) that may act in the collective psyche (Tarnas, 2006). It should, however, be noted that even if the description of a 5th person perspective opens the space for theories and claims that are considered scientifically controversial, evaluating them in terms of soundness and rigor would rather be an act of complex or critical thinking that first require understanding and addressing them from a 5th person perspective.

The subject, the way in which knowledge and information are acquired, is here proposed to be intuition,

which is described by Encyclopedia Britannica (2023) as follows:

> "Intuition, in philosophy, the power of obtaining knowledge that cannot be acquired either by inference or observation, by reason or experience. As such, intuition is thought of as an original, independent source of knowledge, since it is designed to account for just those kinds of knowledge that other sources do not provide."

This description points to sources of knowledge that are beyond sensory experience (which is the subject at the concrete tier) and reason (which is the subject at the abstract tier) and may also include aspects described by Cook-Greuter (2013, p. 81):

> "As the process of self-awareness deepens and reasoning becomes further differentiated for individuals at the 5th person perspective, access to intuition, bodily states, feelings, dreams, archetypal and other transpersonal material increases."

It may be noted that at the 5th person perspective both the subject, intuition, and the object, non-conceptual entities, are described in negatives – in terms of what they are not. Intuition is, from the quote above, appropriately described as a source of knowledge other than what is employed in the two first tiers, sensory experience and abstract reasoning. The use of the term 'non-conceptual entity' points towards something beyond a concept, which is defined by the online Merriam-Webster dictionary as "something conceived in the mind: thought, the notion" or "an abstract or generic idea generalized from particular instances".

A possible way of describing a 6th person perspective consistent with the patterns and dynamics of the previous tiers is that one here can take the perspective of the way intuition is being applied to acquiring knowledge of the world. If the 4th person perspective implies recognizing the embeddedness in the abstract system one tries to understand, a possible parallel to the 6th person perspective would be recognizing and identifying with the non-conceptual one takes a perspective on.

3   Results

In the following, the different orders of perspective taking on psychological, relational, and physical reality will be described according to the previously named sources. The descriptions start with the proposed succinct theoretical definition of the respective perspective.

3.1   1$^{\text{st}}$ Person Perspective

> *1$^{\text{st}}$ person perspective* means seeing the concrete physical reality of things and matter by utilizing the five senses, where no social involvement is present.

The 1$^{\text{st}}$ person perspective corresponds to Selman's description of level 0. He uses the term level is used to denote the formal and developmental aspect of perspective taking whereas stage is used to represent the individual's wholistic development across different domains. Here follows Selman's own description of his level 0 of social perspective taking:

> "Level 0: Undifferentiated and Egocentric Perspective Taking (about Ages 3 to 6)
>
> Concept of Persons: Undifferentiated. At this level, young children do not clearly differentiate physical and psychological characteristics of persons. Feelings and thoughts can be observed and recognized, but the confusion between the subjective-psychological and the objective-physical leads to confusion between acts and feelings or between intentional and unintentional behavior.

Concepts of Relations: Egocentric. Selves and others are clearly differentiated only as physical entities, not psychological entities. Thus subjective perspectives are undifferentiated and that another may interpret the same situation differently is not recognized. Concepts of relations of perspectives are limited by inability to differentiate clearly and by concomitant reduction of differences in perspectives to merely differences in perceptual perspective." (Selman, 1980, p. 37)

The 1st person perspective is characterized by embeddedness in one's own perspective and only experiencing the outside physical world from where one is using one's five senses, although vision is typically the most articulated. Selman estimates that the child enters this stage around age three, as the child's self is clearly separated from others as a physical entity.

Psychological: At this stage, the physical and psychological aspects are not differentiated; everything is seen as material objects, even oneself. The child can observe feelings and thoughts but cannot separate intentions (inner/psychological) from actions (outer/physical); one is sad because one is crying and not the other way around. Other people are characterized in terms of their physical appearance, as being tall or dark-haired. As with other persons, the child's own inner dimension is not recognized and only outer characteristics are given. Applying symbols and language is developed, although speech is characterized by Piaget as being ego-centric rather than relational.

Relational: Although the self is clearly separated from others in a physical sense, social relating is referred to as egocentric. A relation is understood simply as a momentary physical interaction. You may have a relationship if you are at the same place and do the same thing, being in the same room and playing with the same toys, which is something that just happens rather than being intentionally planned. The relation with the parent or caregiver is articulated by them serving the children's physical needs, such as making dinner. The parents have authority over the child through their physical size and strength.

Physical: There is no contextual awareness of the outer world. The child can only focus on a singular object or aspect of a situation at a time. Understanding of time is thus absent other than taking for granted that we are in the present now. This is referred to as centration and is associated with Piaget's notion of the pre-operational stage. This inability to coordinate more than one situation and more than one fact makes the world appear very fluid. Cause and effect are not recognized accurately. There are confusions between perceived and actual events and between fantasy and reality, which we typically refer to as magical thinking. Preoperational thinking also means that the properties of objects are not preserved between two situations, which is illustrated by Piaget's experiment with the fluid in glasses of different sizes. The awareness of the existence of objects is, however, preserved and children are from an early age aware that an object remains behind a veil when it is temporarily hidden from them. In the 'three mountain problem', the pre-operational child is asked to make a drawing of what a doll placed at different positions in relation to the mountain: "...each time the doll is moved the child makes a new picture [...] to reproduce the observer's point of view. Nevertheless, when examined, each of these pictures turns out to be the same. They all show the mountains from a single point of view, that of the child himself." (Piaget & Inhelder, 1970, p. 212)

In conclusion, although a 1st person perspective is here expressed associated in terms of limitations in a developmental sense, it is always accessible to us. This order of perspective taking is easily described by means of its absence and what is not seen. What is lacking is the recognition that we and others see the world from a certain physical position and the context in which we are situated.

3.2   2st Person Perspective

2ndperson perspective means seeing reality through another concrete person's eyes while also recognizing what cannot be seen from that position. It focuses on the concrete world but also opens an inner, psychological reality.

The 2nd order involves taking a 2nd person perspective, meaning being able to see the world through another person's eyes. The shift between 1st and 2nd person perspectives can be demonstrated with tests

such as the Sally-Anne test (Von Tetzchner, 2018) and Piaget and Inhelder's 'three mountain problem'. Now, the child can, in Kegan's description, take their own and others' perspectives as objects and understand that people in different physical positions have different perspectives and that people can lack information that is beyond their visible range. Another person's inner dimension is recognized as distinct from the person's external appearance. This corresponds to Selman's levels 1 and 2.

"Level 1: Differentiated and Subjective Perspective Taking (about Ages 5 to 9)

Concepts of Persons: Differentiated. At Level 1, the key conceptual advance is the clear differentiation of physical and psychological characteristics of persons. As a result, intentional and unintentional acts are differentiated and a new awareness is generated that each person has a unique subjective covert psychological life. Thought, opinion, or feeling states within an individual, however, are seen as unitary, not mixed.

Concepts of Relations: Subjective. The subjective perspectives of self and other are clearly differentiated and recognized as potentially different. However, another's subjective state is still thought to be legible by simple physical observation. Relating of perspectives is conceived of in one-way, unilateral terms, in terms of the perspective of and impact on one actor. For example, in this simple one-way conception of relating of perspectives and interpersonal causality, a gift makes someone happy. Where there is any understanding of two-way reciprocity, it is limited to the physical – the hit child hits back. Individuals are seen to respond to action with like action. [...]

Level 2: Self-reflective/Second-person and Reciprocal Perspective Taking (about Ages 7 to 12)

Concepts of Persons: Self-reflective/Second-person. Key conceptual advances at Level 2 are the growing child's ability to step mentally outside himself or herself and take a self-reflective or second-person perspective on his or her own thoughts and actions and on the realization that others can do so as well. Persons' thought or feeling states are seen as potentially multiple, for example, curious, frightened, and happy, but still as groupings of mutually isolated and sequential or weighted aspects, for example, mostly curious and happy and a little scared. Both selves and others are thereby understood to be capable of doing things (overt actions) they may not want (intend) to do. And persons are understood to have a dual, layered social orientation: visible appearance, possibly put on for show, and the truer hidden reality.

Concepts of Relations: Reciprocal. Differences among perspectives are seen relativistically because of the Level 2 child's recognition of the uniqueness of each person's ordered set of values and purposes. A new two-way reciprocity is the hallmark of Level 2 concepts of relations. It is a reciprocity of thoughts and feelings, not merely actions. The child puts himself or herself in another's shoes and realizes the other will do the same. In strictly mechanical-logical terms, the child now sees the infinite regress possibility of perspective taking (I know that she knows that I know that she knows... etc.). The child also recognizes that the outer appearance-inner reality distinction means selves can deceive others as to their inner states, which places accuracy limits on taking another's inner perspective. In essence, the two-way reciprocity of this level has the practical result of detente, wherein both parties are satisfied, but in relative isolation: two single individuals seeing self and other, but not the relationship system between them." (Selman, 1980, pp. 38-39)

Psychological: A 2nd person perspective enables the inner psychological characteristics to be differentiated from the outer and physical. People are now understood as having an inner psychological life with thoughts, feelings, opinions, and intentions that guide their actions. Mixed feelings or conflicting thoughts towards a specific situation are difficult to recognize in the early phase of this 2nd person perspective (Selman's level 1), but possible in the later phase (Selman's level 2) where they can recognize that a parent may act happy

about a gift not to disappoint the giver. It is also acknowledged that people can deceive. Personality is understood in terms of how one typically feels and acts in certain situations. The first step in applying the 2nd person perspective is seeing the outside world with another's eyes. More challenging is seeing oneself through the other's eyes, as is described in Selman's stage 2 and this perspective's later phase. This is the foundation for socialization into a group and self-reflection as you can conceptualize yourself from the outside. The growing ability for self-reflection gives rise to the awareness that others can do that too. Self-reflection also makes overt actions possible, i.e. actions that the actor really doesn't want to do and have an inside that is not consistent with what they show on the outside.

Relational: The understanding of relations is unilateral in the early phase of this perspective. In the later phase, relations are seen as reciprocal, meaning that the person can imagine being in the other's shoes and knows that the other is capable of the same thing and knows that you know, ad infinitum. With this follows an understanding of a 'give and take' in relations. The relationship is, however, not seen as a system or entity from the outside. A group or a team cannot be understood as an abstraction but rather as a bundle of dyadic relationships. In the first phase of the 2nd person perspective, leadership is understood as unidirectional obedience and is somewhat dictatorial – until the leader gets evicted. In the later phase, leadership in a group or a team is seen as being held by a leader who has dyadic relations with everyone else in the team. These dyads are built on mutual benefit. What is still missing here is a view of the group of more than two individuals as an abstract entity in itself.

Physical: Piaget's concrete operational implies that there is a stable outside world with objects having stable properties, by Kegan (1994) referred to as 'durable categories'. The focus is still on the concrete reality, 'what is', and properties that can be seen or experienced, such as length, weight and number, and not on more abstract properties and the hypothetical, 'what could be'. The concrete operational child (Piagets' stage III, which is also divided into substages IIIA and IIIB) addresses the mountain three according to the following description:

> Stage III, on the other hand (7-8 to 11-12 years), shows progressive discrimination and co-ordination of perspectives. At Substage IIIA (averaging 7-8 to 9 years) certain relationships are varied with changes in the position of the observer, but there is still no comprehensive coordination of viewpoints. This is not achieved until Substage IIIB (about 9-10 years), at which point the mastery of simple perspective is complete (as has already been seen) and perspectives has begun to appear in drawing. (Piaget & Inhelder, 1970, p. 213)

Later research has shown that Piaget and Inhelder underestimated the younger children's ability and overestimated the older's (Shayer et al., 1976). The 2nd person perspective marks a significant shift in perspective awareness although it is limited to dealing with concrete objects, although inner aspects, such as thoughts and feelings, can be recognized, albeit not in an abstract sense.

Being able to take a 2nd person perspective is the main prerequisite to socialization. We become able to follow rules and acknowledge other's expectations of us. Another milestone is that we recognize that we and others have an internal psychological reality as well. Still, all is understood in concrete terms.

3.3   3rd Person Perspective

> *3rd person perspective* means taking the abstract perspective of a generalized other and, from that, visualizing and understanding reality in abstract terms. An inner world, as well as relations and collectives, can be recognized as abstract entities.

In everyday language, a 3rd person perspective typically means to step outside a relation or interaction and view it as a neutral observer. In the developmental sense examined here, it is viewed similarly but more explicitly defined as a generalization of an infinite number of 2nd person perspectives in terms of abstractions, both in the physical reality as well as the social and psychological reality. Starting with the psychological and social aspects from Selman's descriptions of his levels 3 and 4:

> "Level 3: Third-person and Mutual Perspective Taking (about Ages 10 to 15)

Concepts of Persons: Third-person. Persons are seen by the young adolescent thinking at Level 3 as systems of attitudes and values fairly consistent over the long haul, as opposed to randomly changeable assortments of states as at Level 2. The critical conceptual advance is toward the ability to take a true third-person perspective, to step outside not only one's own immediate perspective but outside the self as a system, a totality. There are generated notions of what we might call an "observing ego," such that adolescents do (and perceive other persons to) simultaneously see themselves as both actors and objects, simultaneously acting and reflecting upon the effects of action on themselves, reflecting upon the self in interaction with the self.

Concepts of Relations: Mutual. The third-person perspective permits more than the taking of another's perspective on the self; the truly third-person perspective on relations which is characteristic of Level 3 simultaneously includes and coordinates the perspectives of self and other(s), and thus the system or situation and all parties are seen from the third-person or generalized other perspective. Whereas at Level 2, the logic of infinite regress, chaining back and forth, was indeed apparent, its implications were not. At Level 3, the limitations and ultimate futility of attempts to understand interactions based on the infinite regress model become apparent and the third-person perspective of this level allows the adolescent to abstractly step outside an interpersonal interaction and simultaneously and mutually coordinate and consider the perspectives (and their interactions) of self and other(s). Subjects thinking at this level see the need to coordinate reciprocal perspectives and believe social satisfaction, understanding, or resolution must be mutual and coordinated to be genuine and effective. Relations are viewed more as ongoing systems in which thoughts and experiences are mutually shared.

[. . .]

Level 4: In-depth and Societal-Symbolic Perspective Taking (about Ages 12 to Adult)

Concepts of Persons: In-depth. Two new notions are characteristic of Level 4 conceptions of persons. First, actions, thoughts, motives, or feelings are understood to be psychologically determined, but not necessarily self-reflectively understood. In this view, there are more complicated interactions within a person that cannot always be comprehended by the "observing ego" of Level 3. Thus, we see, whether or not it is so named, the generation of a notion of the unconscious in individuals. Persons are thereby seen to be capable of doing things not that they "don't want" to do, as at Level 2, but that they don't understand why they don't. Second, there emerges at Level 4 a new notion of personality as a product of traits, beliefs, values, and attitudes, a system with its own developmental history.

Concepts of Relations: Societal-Symbolic. The individual now conceptualizes subjective perspectives of persons toward each other (mutuality) as existing not only on the plane of common expectations or awareness, but also simultaneously at multidimensional or deeper levels of communication. For example, in a dyad, perspectives can be shared at the level of superficial information, of common interests, or of deeper unverbalized feelings and communication. At this level, the adolescent or young adult can abstract multiple mutual (generalized other) perspectives to a societal, conventional, legal, or moral perspective in which all individuals can share. Each self is believed to consider this shared point of view of the generalized other or social system in order to facilitate accurate communication and understanding." (Selman, 1980, pp. 39-40)

Psychological: An individual is from an abstract and 3rd person perspective seen as a being with stable traits and personality consistent over a longer time. This enables seeing people as stereotypes, which is typical of the early phase of this perspective. It is also recognized that individuals can have mixed feelings toward someone or something. The later phase means acknowledging the inner unknowns, i.e. that people have blind spots. Selman describes his 4th stage as representing ". . . a new form of understanding which

integrates the elements which emerged at Stage 3". The notion of mixed feelings can here be integrated into the coherent notion of "ambivalence" as a distinct psychological experience. Here, the individual can step outside and see oneself from the outside as a totality as an 'observing ego'. Here the self can interact with itself and examine its own motivations and behavior. A limitation in this first phase of the 3rd person perspective is that the self is assumed to be coherent and fully knowable. In parallel with the view of individuals, it is acknowledged that the self contains aspects that cannot be seen and that the self cannot have control over. The unconscious is introduced as an explanation for the aspects and behaviors that cannot be controlled or understood by either oneself or external causes.

Relational: It is first from the 3rd person perspective that relations are understood as abstract entities and the conception of a group with its own characteristics is recognized. Thus, the view on relationships goes beyond the interaction between actual persons but is seen as an ongoing process where thoughts and experiences are mutually shared. This perspective can be recognized as the generalized other, a term coined by George Hebert Mead (1934), and capture how the individual internalizes the group's or community's attitudes and expectations and reacts or responds towards that. Relations are understood in terms of something that develops as long as both – or all parties since it can now contain a group – invest time and energy into it. The relation can now also include a group as a community and a social whole that is held together by common interests and beliefs on which there is consensus. In the later phase, according to Selman's descriptions of his 4th stage, relations are understood more in terms of processual terms as open transforming systems available to change, flexibility, and growth in the same way that persons can. Here, groups are seen in terms of heterogeneous collections or systems interdependent with individual differences where the differences are not suppressed but rather coordinated by means of a common set of goals and organizational structures in terms of formal regulations.

The recognition of the group as an abstract entity gives the members a common perspective and the ability to take the perspective as the group. At this early phase of the 3rd person perspective, there is no room for pluralism or change. This comes in the later phase (Selman's stage 4). As Selman puts it, "The subject, overly concerned with homogenous values, confuses role differentiation with the lack of a common perspective." There is no room for formal leadership in terms of following formal duties and responsibilities of leadership.

The pluralism and change that follows from formal operational thinking bring in formal regulations. In the later phase of the 3rd person perspective, the organization is seen as not only a static group but also a structure with cultural aspects: "The collective is treated as a kind of organic unity or working machine whose parts are processes distinguished and analyzed in terms of their interdependence in balancing the overall organization, rather than in Stage 3 homogeneity. The subject thinks of the groups as a supra-individual system balanced and maintained by a set of abstract processes set in motion by individual members." (Selman, 1980, pp. 39-40)

It should be noted that these descriptions from Selman may contain content that could be associated with higher orders of meaning making and perspective taking than what was accessible to him at that time.

Physical: A frequently used physics experiment involves a pendulum consisting of two weights of different mass attached to strings of varying length, at which the test persons are asked which of the two variables, mass, and length of the string, that are determining the oscillation time of the pendulum and if two experiments, in which both are varied, are enough to determine the question. At Piaget's formal operational stage, the situation is understood not only as investigating the actual pendulum but rather as a representation and instance of an abstract generalization of the pendulum (Shayer et al., 1976). The properties of this pendulum can thus be understood in abstract terms and be operated on by means of hypotheses that can be tested. Thought experiments and hypothetical deductions can be made that are valid for the actual pendulum, as well as pendulums in general.

Thus, Piaget's formal operational (Stage VI) means taking a 3rd person perspective as its playing field, although it requires corresponding complex reasoning – variable separation and coordination. In the 'three mountain task', the child or adolescent is, from this perspective, able to produce "...a purely schematic plan by substituting for the drawing of material objects a diagram of the area on which their positions are established by exact measurement. This is achieved at Stage IV, the level of abstract, formal operations"

(Piaget & Inhelder, 1970, p. 444). They continue on what is performed from a formal operational ability:

> "In the case of layout diagram a similar transition from natural to conventional, or rather, from physical to abstract co-ordinates, is once more apparent. However, since it is precisely the development of abstract operations which enables the child to understand maps and co-ordinate axes in his school work, the children of 11 and 12 years tend to exhibit a combination of individually worked out and formally learned concepts" (Piaget & Inhelder, 1970, p. 445).

Using abstract maps with coordinate systems are very useful examples of how space can be experienced from a 3rd person perspective. The emergence of a 3rd person perspective and abstract thinking, starting around 10-12 years of age, is one of the most significant milestones in a person's upbringing with a corresponding renegotiation of one's identity around puberty. This is also reflected in the proposed theoretical description since it marks a shift in tier, from the concrete to the abstract tier.

3.4 4th Person Perspective

> *4th person perspective* means recognizing the relation between a certain view of reality and the abstract interpretation of it due to underlying assumptions of frameworks or outlooks. It can acknowledge what cannot be seen from the respective abstract perspective.

Here, we shift the source to the work by Cook-Greuter (2013) that reaches into the post-conventional ways of perspective taking and meaning making. Here follows descriptions and characteristics based on stage descriptions from ego development theory. A central theme in Cook-Greuter's description of the individualist stage emphasizes an awareness of how we interpret reality and participate in it as we observe it rather than being objective and detached from it. Cook-Greuter recognizes the centrality of perspective taking to ego development:

> "None of the other developmental theories seems to pay quite the same attention to the phenomenon of the evolution of perspective taking even though the capacity to take multiple perspectives is mentioned in almost all theories as a mark of more advanced development." (Cook-Greuter, 2013, p. 18)

From the descriptions of the individualist stage (also denoted pluralist or self-questioning), here are quotes that describe 4th person perspective taking.

> "The 4th person perspective represents the next differentiation stage in the sequence of the stage-by-stage differentiation-integration pattern. It is considered a major watershed in EDT as it signifies the move from conventional to post-conventional meaning making.
>
> [. . .]
>
> The 4th person perspective allows individuals to stand outside the system they grew up in and observe themselves and their cultural surroundings from a new altitude. From there one gets a better view of the whole valley or plane below. One can look at the familiar (status quo) through a new lens and query many of its tacit assumptions, values, and beliefs.
>
> The 4th person perspective allows individuals to focus on epistemology, that is, to examine how they came to believe what they believe and feel and how one knows and proves things. The transition to the first post-conventional stage is a watershed in so far as it is the first time that the vertical move and the questioning of previously unexamined ideas is no longer supported by society and its chief conventional representatives. Postconventional thinking and questioning assumptions may be taught and encouraged in college courses, but then challenged and or dismissed at work and at home. [. . .]
>
> With the turn away from the achievement orientation and the external world towards inner experience – Individualists and Pluralists alike discover how subjective one's perspective is

and how much of what seemed objective is in the eye of the beholder. The move from being unconsciously embedded in a cultural surround to having a perspective on it can be both liberating and confusing." (Cook-Greuter, 2013, pp. 53-54)

Psychological: The awareness of the limitations of objectivity and fixed frames of reference implies that people have unique perspectives and understanding of reality. People are understood as being socially and culturally conditioned, and the realization of this brings mental freedom to the individual. Relativism is a common theme that stems from the awareness of the limitations and unprovable assumptions that underlie all frameworks and claims of truth. The later phase of the 4th person perspective, given by the descriptions of the strategist or autonomous stage, implies an ability to coordinate different understandings of reality in terms of norm-systems, ideologies, or cultural systems. The later phase of the 4th person perspective is described as follows:

"The Autonomous stage represents an enlarged fourth person perspective which places the individual's experience into the context of multiple worldviews and within people's whole lifetime." (Cook-Greuter, 2013, p. 62)

The view of oneself is similar to the individual in general. According to Cook-Greuter, the purely rational and cognitive focus of the 3rd person perspective is enriched by this new recognition of the limitations of objectivity. From ego development, a general trend is that a higher stage means an increased ability for introspection, self-reflection, and contextual awareness. From these descriptions, an individual is understood as being in a process of self-discovery.

Relational: From the 4th person perspective, relations are seen as organic and emergent entities. Individuals in a collective value expressions and voices from everyone without imposing any frames or expected outcomes. It is also recognized how themselves and groups behave differently in different conditions and contexts. Ego development describes an increased capacity for empathizing with others and tolerating their ideas and behaviors. There is a growing awareness of how the own interpretation of events and situations is colored by one's own environment and the focus on stepping out of the cultural embeddedness:

"At this stage of differentiation, individuals realize that all groups and societies see it as their mandate to mold the minds and hearts of their members. What's novel is that they can now perceive how much their values and worldviews have been influenced by the environments into which they were born, in which they were raised, and in which they currently operate. Who we think we are depends on the historical context, geographic place, economic circumstances, education, the overall structure of the society, and many other factors that are part of shaping us." (Cook-Greuter, 2013, p. 54)

In the later phase associated with the strategist stage, relations are typically understood in terms of "inevitable mutual interdependence" (Cook-Greuter, 2013, p. 71) combined with a respect for one's own and others' autonomy.

A key challenge in the approach of discerning perspective taking from other features of the stage, such as complex and systems thinking or identification. This discernment is not visible in Cook-Greuter's or any other's description or figurative representation. The quotes above demonstrate some descriptions of the content of the perspective, what is being seen, rather than formalized descriptions involving both what is subject and object of awareness from the 4th person perspective.

Physical: Currently, there are only very sparse and tentative descriptions of how the physical world appears from the 4th person perspective other than the view of reality depending on the position of the observer. Cook-Greuter (2013) describes a view of time that goes beyond experiencing a linear flow with cause and effect, a start and a goal, to focus more on the process and unfoldment in itself.

The strong emphasis on how our interpretation of reality is a function on our conditioning rather than us seeing the world 'as it is' is consistent with the proposed definition of the 4th person perspective's recognition of the abstract perspective taking.

3.5   5th Person Perspective

> 5th *person perspective* means to take the subject-object relation and other non-conceptual entities as objects of awareness by means of intuition. Patterns or phenomena that manifest across the division of subject and object can be recognized.

The 5th person perspective is here even more tentatively described than the previous stages due to the scarcity of data, greater variations of functioning of the few individuals found at the higher stages along with the inherent limitations of language in the process of measuring and describing the stages. Characteristics of a 5th person perspective are taken from Cook-Greuter's (2013) descriptions of the first postautonomous stage, the Construct-aware stage, also referred to as the Ego-aware stage (which points towards a later and more mature phase of this stage of ego development).

Many descriptions point towards a broader scope and deeper understanding of how we make meaning of the world and ourselves and how we function as human beings. The notion of a 5th person perspective is introduced by Cook-Greuter, albeit not clearly defined.

> "I originally named the 5th person perspective as the Construct-aware stage because becoming aware of the constructed nature of reality is one of the most salient characteristics of this stage distinguishing it from prior stages." (p. 77)

As before, the description of this stage involves perspective taking along with other aspects of meaning making, such as complex thinking or identification, and the quotes represent the parts that best reflect the former, to the extent these may be differentiated and peeled apart. For instance, in the following quote, the first sentence points to perspective taking, what one recognizes as reality, whereas the second sentence focuses on the action of creating super theories, which also can be seen as an expression of complex thinking – to operate on and organize perceived elements of reality.

> "The Construct-aware stage represents folks who are aware that meaning is constructed, invented, generated rather than inherent in things, events and concepts. At the same time, Construct–aware people try with great ingenuity and dedication to create super theories or multidimensional maps or tapestries of reality." (p. 77-78)

Psychological: The most emphasized description of the construct-aware stage points to the awareness of the constructed nature of meaning making:

> "Now people come to realize that all objects are human-made constructs, including for instance such abstract constructs as purpose, linear time, and the ego. All are based on layers upon layers of symbolic abstraction. Even such an everyday concept as a "bed" is an enormous simplification. No two people's mental picture of a bed is alike and no two beds in the world are identical. And yet we all use the term "bed" and it works well for most purposes of communication. To become cognizant of the pitfalls of the language habit as well as its tremendous gift to humanity, is a unique feature of the most advanced ego stages.
>
> At the first postautonomous stage, the conventional belief in a permanent object world and the idea of a clearly delineated and achievable self-identification begins to be questioned and investigated. The arbitrariness of labeling reality is recognized as crucial to any knowledge endeavor including the seeking of self-knowledge." (p. 73)

This earlier phase of this stage of ego development is described as having a more outward focus, whereas the later Ego-aware phase is more directed towards understanding the self and the own ego:

> "In contrast to the Construct-aware insights, Ego-aware individuals tend to be people who have become aware of the pattern of development that encompasses an ever broader realm of experience, action, feelings, and thought. Above all, they may viscerally get the absurdity of

> trying to understand reality with the mind and via representational means alone. [...] Unlike the more cognitively-oriented people with the 5th person perspective, Ego-aware individuals focus more on the ego's clever and vigilant machinations at self-preservation by creating the illusion of a permanent self-identity. Final knowledge about the self or anything else is seen as illusive and unattainable through effort and reason because all conscious thought, all cognition are recognized as constructed and, therefore, split off from the underlying, cohesive, non-dual territory. Even such a concept as "ego" or "feelings" become now questionable." (p. 78)

Besides demonstrating a generally deeper understanding of how we make meaning of reality and ourselves, the descriptions clearly and repeatedly emphasize the limits of language and abstract, symbolic representations of objects, events, processes, as well as reality in itself. The recognition of "the non-dual territory" hints towards a dissolution of the subject-object division.

From the descriptions of the 5th person perspective taking, the way of seeing reality thus reaches beyond the abstract and into the archetypal using other ways of knowing than the rational or mental, such as using intuition:

> "As the process of self-awareness deepens and reasoning becomes further differentiated for individuals at the 5th person perspective, access to intuition, bodily states, feelings, dreams, archetypal and other transpersonal material increases." (p. 81)

Relational: The descriptions of the construct-aware stage primarily describe the inner psychological workings of the individual and the consequences this has for understanding reality (typically encompassing inner and outer, individual and collective expressions). However, some comments address the relational aspect as well.

> "In groups and organizations, they may notice archetypal and group process patterns that elude other observers. They may understand larger group forces and castings of individuals in the human drama, that the lead actors themselves are not aware of." (p. 83)

Physical: The timeframe at the stage where the individual experiences reality from a 5th person perspective goes "beyond own lifetime" and takes a "global-historical perspective" (p. 76).

Besides the deepening understanding of how we reify reality and project meaning on the world, little is stated on the actual nature of the physical world, for instance in terms of classical or modern physics.

A central theme in Cook-Greuter's description is to reach beyond the constructions and abstractions that we use to navigate the world. Archetypal patterns that may be intuited point to an understanding of reality that transcends the subject-object division.

Although Cook-Greuter mentions a 6th person perspective, she has no explicit descriptions of it. Therefore, the proposed theoretical definition of this perspective will not be compared or discussed but treated as a postulated extrapolation of the proposed theory and pattern.

4   The Development of Understanding Physical reality

A central aim of the analysis and approach is to formulate orders of perspective taking that is general and applicable to all domains of reality, here assumed to be the physical, psychological and relational. If we accept the definition of the orders of perspective taking to be valid, they may be applied to physical reality or, more specifically, to the understanding of space and time. A 1st and 2nd person perspective on physical reality based on the work by Piaget and Inhelder has been discussed in the previous section. From the 3rd person perspective, physical reality can be experienced in terms of abstractions and generalizations, for instance, by imagining the space abstractly represented by a map or globe covering areas not yet visited by the individual or by means of some set of coordinates. It may also comprise atoms and distant galaxies as part of our physical world, although they are beyond our concrete senses to grasp; no one has ever directly experienced a fundamental elementary particle, such as an electron, with their bare senses. Rather, we use

theories and abstractions to represent the objects in question. Time may be perceived as clock-time which may be measured accurately and objectively. Both time and space are defined and measured according to the International system of units (abbreviated SI from Système international d'unités) in seconds (derived from the cesium-133 atom frequency) and meters (derived from the speed of light and a second). They are thus assumed to be absolute and independent from the position of an observer. It is, from this 3rd person perspective, associated with Newtonian mechanics, meaningful to speak about events occurring simultaneously across the universe.

According to the definition of the 4th person perspective, our representations of physical space may be conceptualized in relation to the assumptions and frames of reference that are applied in representing it. For instance, the commonly used Mercator projection of the earth can be criticized for being biased towards Europe and the northern hemisphere, making them appear at the center of attention and larger than the southern. Further can be noticed that world maps typically emphasize countries and borders rather than the roads and interconnectedness between different cities, which tells us something about the world as well as how we conceptualize it on an abstract level. Although a heliocentric worldview is typically promoted from a 3rd person perspective, as the geocentric also can be, the notion of a center and fixed reference point around which the planets or universe revolve is a hallmark of a 3rd person perspective. A view from a 4th person perspective may then transcend the fixed reference or coordinate system to involve the frame of reference as a variable to be altered. Time can here be conceived as having different scales, such as from a personal everyday perspective compared to historical time or deep time which involve geological or cosmic scales. From a collective and cultural development perspective, space and time can be seen as intertwined in Einsteinian space-time and always relative to an observer as described by the theories of special and general relativity. For instance, the twin paradox states that a twin traveling near light speed will age slower than the other twin that lives his life on earth. According to Einstein's general relativity, time also slows down in a reference system exposed to higher gravity. Our ability to accurately measure time also confirms that time passes quicker on mountain tops than at sea level.

Another example of a 4th person perspective on physical reality comes from the Copenhagen interpretation of quantum mechanics according to Niels Bohr, as described by Karen Barad (2007). The Copenhagen interpretation is one of the most widely accepted ways of making sense of experiments such as Young's double-slit experiment, where single photons seem to create interference patterns with themselves and thus demonstrate wave or particle characteristics depending on the experimental setup. Bohr concluded that it wasn't possible to entirely isolate the properties of the photon from the properties of the measurement setup and that the only conclusion that could be made was in relation to the system of measurement setup together with the photon, or in other words, by understanding the system of subject (measurement setup) and object (photon). Correspondingly, in the 'three mountain problem', a 2th person perspective implies that whether an object is visible or hidden behind a mountain depends on the position of the viewer or concrete observer.

Further examples of ways of relating to space from a 4th person perspective can be found in the research field of place studies, which Sue McGregor (2011) recognizes as a transdisciplinary field according to the axioms formulated by Nicolescu. The field of place studies considers places to be more than geography but are also subjective and personal as it encompasses emotional and cerebral aspects. David Gruenewald (2003) describes five dimensions of place that reach beyond the physical and geographical, namely the perceptual, the sociological, the ideological, the political, and the ecological dimensions. This way of relating to place is argued to be based in a 4th person perspective of physical reality since it encompasses and coordinates both an objective and physical aspect of place with the subjective and interpretative aspects.

A 5th person' perspective of physical reality would imply something explicitly beyond our abstract view of space and time, albeit intertwined or relativistic, and beyond a division of subject and object. There are likely several such candidates, but one example given here is 'Dual aspect monism' as described by Harald Atmanspacher and Dean Rickles (2022). They describe an underlying psychophysically neutral aspect of reality from which mental and physical phenomena are decomposed. This dual aspect monism can be traced back to Benedict de Spinoza, who introduced it as a way of addressing the Cartesian dualism and split of mind from matter. This view of reality was also reflected in different variants by several leading

theorists engaged in quantum mechanics: Wolfgang Pauli together with Carl Jung (with expertise primarily in psychology), Arthur Eddington with John Wheeler and David Bohm together with Basil Hiley. The understanding of this psychophysically neutral underlying aspect was described in terms an "Unus Mundus" and of being "space-/time-less" (Pauli-Jung) and "pre-spacetime" (Bohm-Hiley). Eddington and Wheeler used the figure of the Ouroboros, the serpent biting its own tail and as the letter U, where an eye is placed at one of the vertical strokes and observing the opposite vertical stroke, illustrating how we are intrinsically a part of the universe we try to observe.

These are examples that hint at how reality may be perceived from a 4th and 5th person perspective, but they should be seen as suggestions and an invitation to further discussions. When engaging in such, one should keep in mind that the world from a 5th person perspective does not allow itself to be captured in abstractions, models or language at all, which Cook-Greuter's notion of construct-aware points to.

5 Discussion and Conclusion

The overarching aim of the analysis is to define orders of perspective taking, sometimes referred to as person perspectives. A rationale for the analysis is to distinguish between perspective taking from other aspects of ego development, such as complex thinking, and to generalize the analysis beyond social perspective taking to the physical reality. Six orders of perspective taking, from 1st to 6th person perspective, have been introduced and discussed. The orders are organized into three tiers, the concrete, the abstract, and the non-conceptual, with two orders in each tier. The first three orders are compared with Selman's stages of social perspective taking, where two stages correspond to one order of perspective taking, except for the first order that contains Selman's level 0. The 4th and 5th person perspectives are compared with Cook-Greuter's descriptions of perspective taking from ego development theory along with observations of recurring patterns between the concrete and abstract tiers. A speculation on the nature of a 6th person perspective is introduced for consistency of having two orders for each tier. A more general formulation of orders of perspective taking allows for generalization into an understanding of the physical reality according to a 4th and 5th person perspective. In line with descriptions from Selman and others, an overall trend in an increased ability for perspective taking also implies a deeper understanding of self, individuals, relations, and the physical world.

From the analysis, it is argued that it is meaningful to conceptualize perspective taking according to this formulation with six orders and that it seems to constitute a basic aspect of ego development. The second assumption, that each order of perspective taking corresponds to two stages of ego development, is also consistent with the analysis, at least from the 2nd to the 4th person perspective. The 2nd and 3rd person perspectives also match Selman's stages 1-2 and 3-4, respectively. The difference between the earlier and later phases of a certain perspective taking has, however, not been clarified yet and is beyond the scope of this analysis. A suggestion at this point is that the difference between the early and later phases of perspective taking lies in the complex thinking and ability to operate on and coordinate the components of reality and perspectives that appear to the subject. Another possibility is that the later phase (and stage of ego development) comes with the ability to apply the perspective on understanding oneself rather than on others and physical reality.

Another aspect to be considered is whether the development of perspective taking really adheres to hard stage criteria as assumed. Would it be possible to "skip stages", for instance, by going from a 3rd person perspective directly to a 5th person perspective without first recognizing a 4th person perspective? And would it be possible to understand abstractions (3rd person perspective) without socialization (2nd person perspective)? From the understanding of a 3rd person perspective as a generalization of a number of 2nd person perspectives, it could be analytically argued not to be. This would, however, need to be tested empirically.

The presented analysis and theory for perspective taking is here also argued to adhere to Nicolescu's axioms for transdisciplinary methodology, the ontological, logical and complexity axioms (Nicolescu, 2010). The ontological axiom's recognition of levels of reality is explicit in the orders of perspective taking, where

the world is a direct consequence of our perspective on it. The logical axiom emphasizing the hidden third, which could be seen as either perspective taking itself, which can be seen as the dialectical relation between subject and object (Hagström, 2023), or the psychophysically neutral aspect of reality described by Atmanspacher and Rickles (2022) that is intuited from a 5th person perspective. Finally, the complexity axiom can be seen as manifested in the generality of perspective taking across the physical, psychological and relational dimensions or aspects of reality. Thus, the development of the theory of perspective taking is argued to be a transdisciplinary endeavor according to Nicolescu's definition.

In terms of methodological limitations, there are several critical aspects of the analysis that should be highlighted here. The comparison with the 1st to 3rd person perspectives follows established developmental psychological sources in Piaget and Selman, although these sources express perspective taking in a more fine-grained and detailed manner in terms of how you understand persons and relations. In the comparison of the 4th and 5th person perspectives, one challenge has been to differentiate perspective taking from the other aspects of meaning making in Cook-Greuter's stage descriptions. This process has been guided by the assumption that perspective taking should be considered as a basic aspect of development that cannot be reduced to complex thinking. Perspective taking is thus seen as the process of acquiring knowledge rather than how we organize it more or less complexly. It should also be emphasized that this process of formulating condensed definitions of perspective taking by necessity reduces the complexity, richness, and nuances from the stage descriptions of the source theories, which in turn are condensed descriptions of the empirical data of the respective theory. The goal is not, however, to accurately represent the results from the respective theory but rather to elucidate the core and essence of the respective ways of taking perspective to be able to generalize to physical reality. It also supports the process of distinguishing perspective taking as a basic dimension of human development from other dimensions, such as complex thinking.

It should be noted that the aim to differentiate the perspective taking from other aspects of ego development may be considered reductionistic given more holistic approaches by e.g. Laske (2008) and Kegan. An analysis that is more in line with acknowledging the process aspect of development and interconnectedness of the different basic aspects of human development is presented by Hagström (2023). The present analysis focuses more on the taxonomic and stage-based aspects of development, which are here assumed to be more accessible to be applied in domains such as describing physical reality and engaging in discussions around collective development.

A proposed next step in this work on describing perspective taking in an analytical sense is to design measurement instruments to establish individuals' ability to take a 4th and 5th person perspective empirically. Tests for 2nd person perspective involve Piaget and Inhelder's 'three mountain problem' and the 'Sally-Anne test' along with variations of them, and a 3rd person perspective can be tested, e.g. by means of a Piaget-pendulum developed by Michael Shayer (Shayer et al., 1976) that can test for formal operational thinking. Another approach towards testing is by means of using dilemmas and interviews, as performed by Selman. An alternative route towards formulating the proposed general theory of perspective taking could have been to first develop a measurement instrument and formulate the orders of perspective taking inductively rather than the proposed deductive approach where the theory is formulated first.

Although there are several fields and issues where perspective taking is relevant, such as addressing sustainability challenges Jordan (2021) and the meaning crisis (Schmachtenberger, 2019; Vervaeke, 2019; Vervaeke et al., 2017), the initial motivation for the study came from two sources: Hagström's framework identifying basic aspects of the development of meaning making and the author's own approach to collective development and intelligence, in which perspective taking is a key component. It is here argued that perspective taking should be considered and discussed as a key and basic aspect of human development and intelligence, and possibly also as a way of approaching intelligence in artificial intelligence systems. For instance, the author confirmed that Chat GPT-4 does pass both the 'Sally-Anne test' and the more advanced Social perspective Taking Acts Measure (Diazgranados et al., 2011). An ambition of the presented analysis is to start a discussion around the relevance of perspective taking and how it can be approached, defined, measured, and developed, particularly the 4th and 5th person perspective and further.

References

Andree, R. S. (2022). *Exploring the Developmental Nature of Connections: A Study of Perspectival Action Developmental Patterns in High-Quality Connections.* Fielding Graduate University].

Armon, C. (1984). *Ideals of the good life: A longitudinal/cross-sectional study of evaluative reasoning in children and adults.* Harvard Graduate School of Education].

Augsburg, T. (2014). Becoming transdisciplinary: The emergence of the transdisciplinary individual. *World Future,* 70, 233–247.

Barad, K. (2007). *Meeting the universe halfway: Quantum physics and the entanglement of matter and meaning.* Dduke university Press.

Basseches, M. (1984). *Dialectical thinking and adult development.* Norwood, NJ: Ablex. [Bibliographies]. Ablex.

Basseches, M., & Mascolo, M. F. (2009). *Psychotherapy as a developmental process.* Routledge.

Campbell, J. (2008). *The hero with a thousand faces.* (Vol. 17). New World Library.

Commons, M. L. (2008). Introduction to the model of hierarchical complexity and its relationship to postformal action. *World Futures,* 64(5-7), 305-320.

Commons, M. L., Miller, P. M., Goodheart, E. A., & Danaher-Gilpin, D. (2005). *Hierarchical complexity scoring system (HCSS): How to score anything.* Unpublished Scoring Manual. Dare Institute.

Commons, M. L., & Ross, S. N. (2008). What postformal thought is, and why it matters. *World Futures,* 64(5-7), 321-329.

Cook-Greuter, S. R. (1999). *Postautonomous ego development: A study of its nature and measurement.* Harvard University.

Cook-Greuter, S. R. (2013). *Ego development: Nine levels of increasing embrace.* Unpublished manuscript.

Dawson, T. L., Xie, Y., & Wilson, M. (2003). Domain-general and domain-specific developmental assessments: do they measure the same thing? *Cognitive Development,* 18(1), 61-78.

Diazgranados, S., Dionne, M., & Selman, R. (2011). *The social perspective taking acts measure (SPTAM).* Unpublished manuscript, Graduate School of Education, Harvard University, Cambridge, MA.

Engel, G. L. (1977). The need for a new medical model: a challenge for biomedicine. *Science,* 196(4286), 129-136.

Etymonline. (n.d.). Perspective. Retrieved 2023-06-10 from https://www.etymonline.com/word/perspective

Fischer, K. W., & Bidell, T. R. (2006). Dynamic development of action and thought. *Handbook of child psychology,* 1, 313-399.

Flavell, J. H. (1977). *Cognitive development.* Prentice-Hall.

Flavell, J. H. (1992). *Perspectives on perspective taking. Piaget's theory: Prospects and possibilities,* 107-139.

Fuhs, C. J. (2016).*A latent growth analysis of hierarchical complexity and perspectival skills in adulthood.* Fielding Graduate University.

Gruenewald, D. A. (2003). Foundations of Place: A Multidisciplinary Framework for Place-Conscious Education.*American Educational Research Journal.* 40(3), 619-654.

Hagström, T. (2023). *The Developing Human Mind: A Duality System of Meaning Making.* Springer Nature.

Hagström, T., & Stålne, K. (2015). The Generality of Adult Development Stages and Transformations: Comparing meaning making and Logical Reasoning. *Integral Review,* 11(3), 30-71.

Hill, J. (2020). 16. Architecture in the dark.*Expanding Fields of Architectural Discourse and Practice.*

Hy, L. X., & Loevinger, J. (1996). *Measuring ego development* (Second edition ed.). Erlbaum Associates, Inc., Mahwah, NJ.

Jordan, T. (2021). *Inner Development Goals: Background, method and the IDGs framework.* https://static1.squarespace.com/static/600d80b3387b98582a60354a/t/640605519559993bd30bc15f/1678116201110/ IDG_Report_Full.pdf

Jung, C. G. (1959). *The archetypes and the collective unconscious.* Routledge.

Kegan, R. (1982). *The evolving self: Problem and process in human development.* Harvard University Press.

Kegan, R. (1994). *In over our heads: The mental demands of modern life.* Harvard University Press.

Kohlberg, L. (1969). Stage and sequence: The cognitive-developmental approach to socialization. *Handbook of socialization theory and research,* 347, 480.

Kohlberg, L. (1979). *The meaning and measurement of moral development.* Clark University Press.

Kohlberg, L., & Armon, C. (1984). Three types of stage models used in the study of adult development. *Beyond formal operations,* 1, 357-381.

Laske, O. (2008). *Measuring Hidden Dimensions of Humans Systems, Foundations of Requisite Organisation* (Volume 2). In: Interdevelopmental Institute Press, Medford Massachusetts.

Light, P. (1979). *The development of social sensitivity: A study of social aspects of role-taking in young children.* Cambridge University Press Cambridge, UK.

Loevinger, J. (1998). *Technical foundations for measuring ego development: The Washington University sentence completion test.* Psychology Press.

Mansilla, V. B., Jackson, A., & Jacobs, I. H. (2013). Educating for global competence: Learning redefined for an interconnected world. *Mastering global literacy, contemporary perspectives,* 1-23.

McGregor, S. L. T. (2011). Place and Transdisciplinarity. *Transdisciplinary Journal of Engineering & Science,* Vol 2, 10-19.

Mead, G. H. (1934).*Mind, self, and society* (Vol. 111). University of Chicago press Chicago.

Murray, T., & O'Fallon, T. (2020). A Summary of Research on and with the STAGES Developmental Model. *Integral Review,* 16(1), 39-68.

Nicolescu, B. (2002). *Manifesto of Transdisciplinarity*; Claire Voss, K., Translator; State University of New York Press: New York, NY, USA.

Nicolescu, B. (2010). Methodology of Transdisciplinarity – Levels of Reality, Logic of the Included Middle and Complexity. *Transdisciplinary Journal of Engineering & Science,* 1, p. 17-32.

O'Fallon, T. (2020). States and STAGES: Waking up Developmentally. ıIntegral Review: A Transdisciplinary & Transcultural Journal for New Thought, Research, & Praxis, 16(1).

O'Fallon, T., Polissar, N., Neradilek, M. B., & Murray, T. (2020). The validation of a new scoring method for assessing ego development based on three dimensions of language. *Heliyon,* 6(3), e03472.

Pfaffenberger, A. H., Marko, P. W., & Combs, A. E. (2011). *The postconventional personality: Assessing, researching, and theorizing higher development.* State University of New York Press.

Piaget, J. (1965). *The Moral Judgment of the Child.* Trans. M. Gabain. New York: Free Press.

Piaget, J., & Inhelder, B. (1970). *The child's conception of space.* Routledge and Kegan Paul, London.

PISA, O. (2018). Preparing our youth for an inclusive and sustainable world. In: *The OECD PISA Global Competence Framework.* OCDE. Paris.

Rodriguez, J. A. (1992). *The adult stages of social Perspective taking: Assessment with the doctor-patient problem.* Harvard University.

Scharmer, O., & Pomeroy, E. (2024). Fourth Person: The Knowing of the Field. *Journal of Awareness-Based Systems Change,* 4(1), 19–48-19–48.

Schmachtenberger, D. (2019). The War on Sensemaking, Daniel Schmachtenberger [Interview]. *Rebel Wisdom.* https://www.youtube.com/watch?v=7LqaotiGWjQ

Selman, R. L. (1980). *The growth of interpersonal understanding: Developmental and clinical analyses.* Academy Press.

Shayer, M., Küchemann, D., & Wylam, H. (1976). The distribution of Piagetian stages of thinking in British middle and secondary school children. *British Journal of Educational Psychology,* 46(2), 164-173.

Sinnott, J. (2003). Complex postformal thought and its relation to adult learning, lifespan development, and the new sciences. *Adult development in postindustrial society and working life. Stockholm Lectures in Educology,* 78-108.

Stålne, K., Commons, M. L., & Li, E. Y. (2014). Hierarchical complexity in physics. *Behavioral Development Bulletin,* 19(3), 62.

Stålne, K., Pedersen, E. (2021). Transdisciplinary research on indoor environment and health as a social process.*International Journal of Environmental Research and Public Health,* 18(8), 4379.

Tarnas, R. (2006).*Cosmos and psyche:* Intimations of a new world view. Penguin.

Tomasello, M. (2009). *Why we cooperate.* MIT press.

Vervaeke, J. (2019). [Youtube lecturing series]. *In Awakening from the meaning crisis.* https://www.youtube.com/watch?v=54l8_ewcOlY&t=4s

Vervaeke, J., Mastropietro, C., & Miscevic, F. (2017). *Zombies in western culture: A twenty-first century crisis.* Open Book Publishers.

Von Tetzchner, S. (2018). *Child and adolescent psychology: Typical and atypical development.* Routledge.

Wilber, K. (1996). *Sex, ecology, spirituality: The spirit of evolution.* Shambhala Publications.

Wilber, K. (2007). *Integral spirituality: A startling new role for religion in the modern and postmodern world.* Shambhala Publications.

About the Author

Kristian Stålne (1974-) holds a PhD in structural mechanics and MSc in Engineering physics from Lund University and is recognized as an Excellent Teaching Practitioner for integrating adult development perspectives in pedagogic theory and practice and transdisciplinary research. He is a co-founder of ESRAD, the European Society for Research in Adult Development, organizer of its first meeting and part of a Swedish network of researchers that teach and apply adult development theories in various contexts. Kristian is the former lead researcher of the Inner Development Goals initiative and is now affiliated as a senior lecturer with Malmö University in Sweden.