

PUPILS' AGE AND PHILOSOPHICAL *PRAXIS*: TWO FACTORS THAT INFLUENCE THE
DEVELOPMENT OF CRITICAL THINKING IN CHILDREN

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Abstract:

One of the fundamental objectives of Philosophy for Children (P4C) is the cognitive development of pupils. In this text, we examine to what extent the age of the children and the number of years of *praxis* in P4C influence the development of their critical thinking. Participants were groups of pupils (vs. individuals): 13 groups from preschool to the end of elementary school. These groups originated from two schools, one in Quebec and one in Ontario. At the time the data were collected, the Quebec school groups had one year of P4C *praxis*, whereas the Ontario school groups had two years of *praxis*. The content analyzed was the philosophical exchanges among pupils. As an analysis grid, we used the model of the developmental process of dialogical critical thinking (DCT). The model includes four thinking modes (logical, creative, responsible and metacognitive) and six epistemological perspectives (egocentricity, post-egocentricity, pre-relativism, relativism, post-relativism/pre-inter-subjectivity and inter-subjectivity). With regard to the thinking modes, it emerged from the exchanges analyses that age may have an impact on the mobilization of the logical mode, and the number of years of philosophical *praxis* may have an impact on mobilization of the metacognitive mode, however, in all the cases studied, these factors could not be considered particularly determining. With regard to the epistemological development, results showed that the age factor is observable in the lack of mobilization of the more complex perspectives (i.e. post-relativism/pre-inter-subjectivity) in preschool and the beginning of elementary school classrooms. And the impact of the number of years of *praxis* is observable in the increasing sophistication of DCT. In the groups with one year of philosophical *praxis*, the transition from simple perspectives such as pre-relativism to more complex perspectives such as relativism or post-relativism, appeared in the 4th grade, whereas in groups with two years of *praxis* it appeared in the 3rd grade, one year earlier.

Key words: Philosophy for children; Dialogical critical thinking; Epistemological perspectives; Preschool and Elementary school.

Age des élèves et *Praxis* Philosophique: deux facteurs qui influencent le développement de la pensée critique chez les enfants

Résumé :

Une des visées fondamentales de la Philosophie pour enfants (P4C) est le développement cognitif des élèves. Dans ce texte, nous étudions dans quelle mesure l'âge des enfants et leur nombre d'années de *praxis* philosophique influencent le développement de leur pensée critique. Les participants étaient des groupes d'élèves (vs les individus) : 13 groupes fréquentant des classes du préscolaire à la fin du primaire. Ces groupes relevaient de deux écoles, situées respectivement au Québec et en Ontario. Les groupes de l'école québécoise avaient une année de *praxis* avec la P4C au moment de la collecte de données; les groupes de l'école ontarienne avaient deux

pupils' age and philosophical *praxis*: two factors that influence the development of critical thinking in children

années de *praxis*. Le contenu analysé était les échanges philosophiques entre élèves. Comme grille d'analyse, nous avons utilisé le modèle du processus développemental d'une pensée critique dialogique (PCD). Le modèle inclut quatre modes de pensée (logique, créatif, responsable et métacognitif) et six perspectives épistémologiques (égocentrisme, post-égocentrisme, pré-relativisme, relativisme, post-relativisme/pré-intersubjectivité et intersubjectivité). Il est ressorti des analyses des échanges, en ce qui a trait aux modes de pensée, que l'âge peut avoir eu une incidence sur la mobilisation du mode logique et le nombre d'années de *praxis* philosophique peut avoir eu une incidence sur la mobilisation du mode métacognitif, mais dans tous les cas étudiés, ces facteurs n'ont pu être posés comme étant particulièrement déterminants. Et en ce qui a trait au développement épistémologique, les résultats indiquent que le facteur de l'âge est observable par l'absence ou la faible mobilisation des perspectives les plus complexes (relativisme, post-relativisme) dans les groupes du préscolaire et du début du primaire. Et le facteur relié au nombre d'années de *praxis* est observable dans le mouvement de complexification de la PCD. Chez les groupes ayant une année de *praxis* philosophique, le passage des perspectives simples comme le pré-relativisme aux perspectives plus complexes comme le relativisme ou le post-relativisme s'est effectué en 4^e année, alors que chez les groupes ayant deux années de *praxis*, il s'est effectué en 3^e année, c'est-à-dire une année plus tôt.

Mots clés: Philosophie pour enfants; Pensée critique dialogique; Perspectives épistémologiques; Préscolaire et école primaire.

Idade dos alunos e *Praxis* filosófica: dois fatores que influenciam o desenvolvimento do pensamento crítico das crianças

Resumo:

Um dos objetivos fundamentais da Filosofia para crianças (P4C) é o desenvolvimento cognitivo dos alunos. Nesse texto, nós estudaremos em que medida a idade das crianças e o número de anos de sua *praxis* filosófica influenciam o desenvolvimento de seu pensamento crítico. Os participantes eram grupos de alunos (vs. os indivíduos): 13 grupos frequentam classes do pré-escolar ao fim do primário. Esses grupos eram de duas escolas, situadas respectivamente no Quebec e em Ontario. Os grupos da escola quebequense tinham um ano de *práxis* com a P4C no momento da colheita de dados; os grupos da escola de Ontario tinham dois anos de *práxis*. O conteúdo analisado era feito das trocas filosóficas entre os alunos. Como grade de análise, nós utilizamos o modelo do processo de desenvolvimento de um pensamento crítico dialógica (PCD). O modelo inclui quatro modos de pensamento (lógico, criativo, responsável e meta-cognitivo) e seis perspectivas epistemológicas (egocentrismo, post-egocentrismo, pré-relativismo, relativismo, post-relativismo/pré-intersubjetividade e intersubjetividade). Ressaiu durante as análises das trocas, no que refere aos modos de pensamento, que a idade pode ter tido uma incidência sobre a mobilização do modo lógico e o número de anos de *práxis* filosófica poder ter tido uma incidência sobre a mobilização do modo meta-cognitivo, mas em nenhum dos casos estudados, esses fatores puderam ser colocados como sendo particularmente determinantes. No que refere ao desenvolvimento epistemológico, os resultados indicam que o fator da idade é observável pela ausência ou a fraca mobilização das perspectivas mais complexas (relativismo, post-relativismo) nos grupos do pré-escolar e do começo do primário. E o fator ligado ao número de anos de *praxis* é observável no movimento de complexificação do PCD. Nos grupos que têm um ano de *praxis* filosófica, a passagem das perspectivas simples como o pré-relativismo às perspectivas mais complexas como



o relativismo ou o post-relativismo se efetuou no 4º ano, quando nos grupos que tinham dois anos de *praxis*, operou no 3º ano, ou seja um ano antes.

Palavras-chave: Filosofia para crianças; Pensamento crítico dialógico; perspectivas epistemológicas; Pré-escolar e escola primária.

Edad de los alumnos y *Praxis* filosófica: dos factores que influyen en el desarrollo del pensamiento crítico de los niños

Resumen:

Uno de los objetivos fundamentales de Filosofía para Niños (P4C) es el desarrollo cognitivo de los alumnos. En este texto, se examina en qué medida la edad de los niños y el número de años de *praxis* en P4C influyen en el desarrollo de su pensamiento crítico. Los participantes fueron grupos de alumnos (vs. personas): 13 grupos desde el nivel preescolar hasta el último año de escuela primaria. Estos grupos se originaron de dos escuelas, una en Quebec y otra en Ontario. Al mismo tiempo que los datos eran recogidos, los grupos de la escuela de Quebec tenían un año de *praxis* en P4C, mientras que los grupos escolares de Ontario tenían dos años de *praxis*. El contenido analizado fueron los intercambios filosóficos de los alumnos. Como grilla de análisis, se utilizó el modelo del proceso de desarrollo del pensamiento crítico dialógico (DCT). El modelo incluye cuatro modos de pensamiento (lógico, creativo, responsable y metacognitivo) y seis perspectivas epistemológicas (egocentrismo, pós-egocentrismo, pre-relativismo, relativismo, post-relativismo/pre-inter-subjectividad e intersubjectividad). En cuanto a los modos de pensar, surgió de los análisis de intercambios que la edad puede tener un impacto en la movilización del modo lógico, y el número de años de *praxis* filosófica puede tener un impacto en la movilización del modo metacognitivo, sin embargo, en todos los casos estudiados, estos factores no podían ser consideradas particularmente determinantes. En lo que respecta al desarrollo epistemológico, los resultados mostraron que el factor de la edad se observa en la falta de movilización de las perspectivas más complejas (es decir, post-relativismo/pre-inter-subjectividad) en el pre-escolar y al comienzo de las clases en la escuela primaria. Y el impacto del número de años de *praxis* se puede observar en la creciente sofisticación de la DCT. En los grupos con un año de *praxis* filosófica, la transición desde perspectivas simples, tales como pre-relativismo a las perspectivas más complejas, como el relativismo o el pos-relativismo, apareció en el 4º año, mientras que en los grupos con dos años de *praxis* apareció en el 3º, un año antes.

Palabras clave: filosofía para niños, pensamiento crítico dialógico, perspectivas epistemológicas; jardín de infantes; escuela primaria

pupils' age and philosophical *praxis*: two factors that influence the development of critical thinking in children

PUPILS' AGE AND PHILOSOPHICAL *PRAXIS*: TWO FACTORS THAT INFLUENCE THE DEVELOPMENT OF CRITICAL THINKING IN CHILDREN

One of the fundamental objectives of Matthew Lipman's Philosophy for Children (P4C) is the development of "good-thinking" (Dewey, 1933), which he refers to as reasoning (Lipman, 1979), critical thinking (Lipman, 1988) or complex thinking (Lipman, 2003).

Several studies, mainly conducted in the 1980s and 1990s, have shown the impact of P4C on the development of pupils' thinking skills related to logical reasoning (among others: Camhy & Iberer, 1988; Cannon, 1987; Cannon & Weinstein, 1985; Caron, 1990; Gazzard, 1988; Kennedy, 1996; Lane & Lane, 1986). However, few empirical studies have examined the development of critical thinking.

Nonetheless, critical thinking is fundamental, in that it stimulates autonomy in youngsters (Cuypers & Haji, 2006; Mejia & Molina, 2007); it favours comprehension as well as stability in learning (Peters et al., 2002; Torff, 2006); when used on oneself, it enables each individual to learn self-awareness and how to exercise metacognitive regulation to improve his or her individual experience (British Columbia Ministry of Education, 2000); to better integrate into society (Ontario Ministry of Education, 2005b), to make enlightened moral decisions (Darling, 2002, 2006; Fong, 2002; Thomas, 2001), and to vitalize democracies (Giancarlo et al., 2001; Lipman, 2003; Paul 1993; Paul & Elder, 2001; Sharp, 2008).

The objective of our research is to study the development of critical thinking in groups of children. We previously studied the manifestations of critical thinking in groups of pupils aged 9 to 12 years¹. This study led to the emergence of a model of the developmental process of "dialogical" critical

¹ The study was subsidized by the Social Sciences and Humanities Research Council of Canada.



thinking (DCT)², comprised of four thinking modes (logical, creative, responsible and metacognitive) that increases in sophistication according to three epistemological perspectives, namely egocentricity, relativism and intersubjectivity (Daniel et al., 2005).

In a subsequent³ study, we continued our research by revisiting and completing this model with the participation of groups of preschool and elementary school children aged 4 to 12 years. The revisited model still includes the four thinking modes; however intermediate perspectives were added to those previously developed (perspectives that precede or follow those previously identified), so that the thinking modes are now developed according to six epistemological perspectives (Daniel & Gagnon, 2011). The revisited model now shows a continuum that reflects the children's DCT, from its weakest to its strongest expression.

But to what extent does the age⁴ of the children and the number of years of philosophical *praxis*⁵ influence the development of their DCT? Determining this is the objective of this paper.

To begin we introduce the model of the developmental process of DCT, which served as an analysis grid. Then we present the context of the experiment and the methodology. Finally, we present our observations and the results of our research.

² Critical thinking is said to be "dialogical" because in this model, critical thinking, whether rudimentary or fully articulated, emerges from interactions with peers.

³ The study was also subsidized by the Social Sciences and Humanities Research Council of Canada (# 410-2009-0028).

⁴ Comparative studies, conducted among young adults (both university students and those without university education) do not refer to participants' ages as a variable that may influence epistemological development, but rather to their level of instruction (Kuhn & Pease, 2006; Tabak & Weinstock, 2008; Weinstock *et al.*, 2006). Within the framework of preschool and primary education, the fact that it is mandatory for all of the children does not enable us to verify whether it is age or schooling that is an influencing factor. Also, we refer to age, this latter factor including the experience acquired with the years and the knowledge acquired in school.

⁵ We prefer to speak of *praxis*, rather than practice, because practice can be a simple repetitive exercise, whereas *praxis* ensures the link between thought and action (Freire, 1972).

pupils' age and philosophical *praxis*: two factors that influence the development of critical thinking in children

Revisited Model of the Developmental Process of Dialogical Critical Thinking

Table 1 illustrates the completed and operational model, as it emerged from the analysis of the philosophical exchanges among groups of pupils aged 4 to 12 years⁶ (see Daniel & Gagnon, 2011).

The developmental model is specific in that: it refers to “dialogical” critical thinking⁷; DCT is multimodal (in addition to logical and creative thinking, it includes responsible and metacognitive thinking⁸); DCT development is rendered operational by means of epistemological perspectives⁹ that is, it is transformed according to the sophistication of the pupils' representations of the world, which can either focus on the self (egocentricity); take into account others' points of view (relativism); be oriented towards the improvement of the common good (inter-subjectivity), and so on¹⁰. Finally, DCT is understood as a research process (vs. an outcome).

⁶ The analyses were qualitative in nature, and although they were conducted in different cultural, geographical and linguistic contexts (Quebec, Australia, Mexico, Ontario, France), they concerned a limited number of groups of pupils (8 in the study that was published in 2005 and 17 in the study published in 2011). A quantitative analysis completed with more groups of pupils would be required in order to validate the model's components.

⁷ To engage in dialogue within a community of inquiry is at the heart of P4C. In dialogue, divergent points of view emerge. Diversity fosters doubt and cognitive conflicts in pupils' minds, which represents the first step in the reflective process leading to critical thinking (Dewey, 1933).

⁸ According to Kwak (2007), critical thinking theories remain strongly rooted in formal logic and universal standards of rationality.

⁹ Epistemological *perspective* differs from epistemological *posture*. Indeed, whereas the posture is linked to an epistemic cognition process identified by the expression of a concept whose object refers to notions of knowledge, the perspective refers to the manner in which meanings and representations of the world are constructed, no matter what the object in question. Furthermore, epistemological posture refers more to the idea of “personal epistemology”, as it is studied in the field of cognitive psychology (for a review : Hofer & Pintrich, 2001), whereas the social character of P4C, in which our work is situated, presents a “relational epistemology” (Thayer-Bacon, 2003; see also Golding, 2009).

¹⁰ The sophistication of pupils' representations underlies two processes related to de-centering (from the self to others and then to the common good) and to abstraction (from concrete/particular to generalization and then to abstraction/conceptualization) (Daniel *et al.*, 2011).



Table 1. Model of the Developmental Process of DCT in Groups of Pupils Aged 4 to 12 Years

MODES/ EPISTEMOLOGY	LOGICAL	CREATIVE	RESPONSIBLE	META-COGNITIVE
EGOCENTRICITY	Statement based on the perceptual experience of a specific and personal fact.	Statement that gives meaning to a personal point of view.	Statement that is related to a personal and specific behaviour linked to a social or moral belief.	Retrospective statement about a personal and specific task, point of view, feeling, etc.
POST-EGOCENTRICITY	Statement based on experience (personal or of someone close) + reasoning.	Statement that gives meaning to a personal point of view (but distanced from self).	Particular/concrete statement linked to a moral or social rule (learned). Not contextualized.	Retrospective statement about a personal task, point of view, feeling, etc. (distanced from self).
PRE-RELATIVISM	Somewhat generalized statement that is not justified or with an implicit, circular or false justification.	Statement that is new, divergent, or that presents different situations/solutions /hypotheses (units) in relation to a personal idea or to someone else's idea.	Statement linked to a somewhat generalized action in a moral or social perspective.	Descriptive retrospective of a personal task, point of view, feeling, etc. (distanced from self).
RELATIVISM	Statement based on a generalization that stems from reasoning and experience. Incomplete/concrete justifications.	Relationship that gives meaning to a peer's point of view (by completing it or adding a nuance or a new relationship/perspective).	Statement that expresses a will to understand/include others (from the immediate environment) with or without appealing to an integrated moral/social rule.	Descriptive retrospective of another person's task, thought, etc. (from the immediate environment).
POST-RELATIVISM/ PRE-INTER-SUBJECTIVITY	Justification based on "good reasons" that stem from simple reasoning.	Relationship that presents a different context that takes into account the group's perspective.	Statement that justifies a desire to understand/include others (distant environment) with or without the use of an integrated moral/social rule.	Descriptive retrospective of another person's task, thought, etc. (distant environment).
INTER-SUBJECTIVITY	Justification based on criteria. Conceptualization based on simple reasoning. <i>Conceptualisation</i>	Evaluative relationship that provides a different meaning and transforms the perspective. <i>Transformation</i>	Doubt that underlies the evaluation of categories (rules, principles, social/moral values). <i>Categorisation</i>	Evaluative statement that expresses a change in perspective following the integration of criticism. <i>Correction</i>

pupils' age and philosophical *praxis*: two factors that influence the development of critical thinking in children

Unlike most models related to reflexive thinking (King & Kitchener, 1994, 2001) and complex or critical thinking (Kuhn, 1999; Kuhn & Park, 2005; Kuhn & Weinstock, 2010; Tabak Weinstock, 2008) that apply to adolescents and young adults, the DCT model concerns groups of pupils aged 4 to 12 years. This does not mean that preschool and elementary school pupils' thinking is in itself critical, that is, evaluative and argumentative, but it supposes that critical thinking is a co-construction process that can begin as soon as pupils' thinking is fed by doubts that stem from significant problems presented by the teacher (Dewey, 1933) or by peers (Lipman, 2003; Lipman *et al.*, 1980).

The components of the model (4 thinking modes and 6 epistemological perspectives) are defined further when we present the results of the analysis with regard to factors of influence.

Experimentation Context and Methodology

The objective of the analysis was to study to what extent the age of pupils and their number of years of philosophical *praxis* are factors likely to influence the developmental process of DCT.

In this particular study, participants were 13 class groups from two schools: 7 groups from a Quebec school (kindergarten to grade 6) and 6 groups from an Ontario school (kindergarten to grade 5¹¹). Diversity in the schools' characteristics are important to ensure representativeness of data: although both are Canadian, Quebec and Ontario are two provinces that have language and cultural distinctions. Diversity was also manifested in the schools educational programs. There was also socioeconomic diversity, as in Quebec the pupils belonged to a working-class environment, while in Ontario the pupils came from a privileged environment. Finally, in the Quebec school, pupils had had one year of experience with P4C at the time data were collected,

¹¹ In this school the French model prevails, which means that elementary schooling ends in the 5th grade.



whereas in the Ontario school pupils had two years¹² of philosophical experience.

In all groups, Lipman's P4C approach was used, although the teachers adapted it to their own personality and their own pedagogical aims. The weekly P4C sessions took place from October to April-May and lasted from 30 to 60 minutes each week, depending on the teacher's availability and the requirements of school planning. At the end of the school-year (April or May), a video recording was made in each class in which a complete P4C session was filmed (30 or 60 minutes, depending on the usual practice for that class). In order to preserve the natural context in each classroom, the researchers did not suggest the topic of discussion. The recordings were transcribed verbatim in their entirety, and then analyzed by the researchers.

The analysis focused on the groups, not on the individuals (see notes 7 and 9). This choice reflects the social dimension of P4C as well as our conception of DCT as a social research process. To proceed with the comparative analysis, we used the developmental model of DCT as a grid. We coded the transcripts from the 13 groups using the components of the model (4 thinking modes and 6 epistemological perspectives). After coding, the number of incidences that emerged for each component was totaled (and expressed in percentages) for each transcript.

Observations and Analysis Results

In this section, we present our observations and results of our analysis, first in relation to the thinking modes, and then in relation to the epistemological perspectives. The results are preceded by a definition of each component.

¹² In this school, the P4C sessions begin in preschool (children 4 years of age) with *The Tales of Audrey-Anne* as a support tool (Daniel, 2002), so that even kindergarten pupils (5 years of age) had two years of philosophical experience at the time data were collected. *childhood & philosophy, rio de janeiro, v.8, n.15, jan./jun. 2012, pp. 105-130. issn 1984-5987 113*

Thinking modes (for detailed percentages, see Table 2)

Logical: This refers to informal logic in which the main characteristic is a search for coherence. The latter is observed in the articulation of language, the convergence of ideas, or the uniformity of an expected discourse. The logical mode is fundamental to the developmental process of DCT because it allows congruity between the question posed and the answer provided, between the statement and its justification, etc.; in its more complex manifestation, it implies rigorous argumentation, that is, premises are justified, analyzed and evaluated in cooperation with peers (among others: see Berland & McNeill, 2010). The main manifestations of thinking skills relating to logical thinking that emerged from the transcripts – from the simplest to the most complex – are: statement, description, explanation, definition, justification and argumentation.

Whether the groups have one or two years of philosophical *praxis*, the global percentage of mobilization of the logical mode in the groups is stable from preschool to the 6th grade and rather predominant (between 33% and 48%). However, among preschool pupils with two years of experience in P4C the logical mode is mobilized in the same percentage as the creative mode; among pupils in the 4th grade the logical mode is mobilized in a slightly lower percentage than the creative mode; and in both 1st grade groups the logical mode is slightly less mobilized than the creative mode. Overall, the percentages of mobilization indicate that the logical mode constitutes the basis for the pupils' discourse. The number of years of philosophical *praxis* does not appear to influence the mobilization of this thinking mode. And although children's age could be considered as an influence factor in the case of the younger pupils (5 to 7 years), it does not appear to be a factor with regard to the 4th grade pupils.

Creative: This refers to a search for meaning, a contextualization of points of view and a transformation of perspectives. In its complex manifestations, this mode of thinking, because of the divergent relationships it creates, is fundamental to the development of DCT. Indeed, it formulates questions (Burnard *et al.*, 2006; Craft, 2000) that stimulate doubts (Dewey, 1933) that lead to "interruptions" in the certainty of participants' representations and, in so



doing, it opens access to more complex resolutions of the problem (Haroutunian-Gordon, 2010). The main manifestations that emerged from the transcripts – from the simplest to the most complex – are: examples, analogies, comparisons, counter-examples, nuances, divergent relationships and critical questions.

In the transcripts, the creative mode ranks second among the modes most mobilized by pupils (between 18% and 54%), after the logical mode. However, there is an exception in the 2nd grade among pupils with two years of philosophical *praxis* where the creative mode was less mobilized than the responsible mode. In its simple manifestations (i.e.: examples), the creative mode seems complementary to the logical mode in that the pupils who are not yet able to justify their points of view with criteria or even with good reasons provide an example as a justification.

Responsible: Responsible thinking, as it emerged from our analyses, is more in line with the Deweyan perspective of “moral thinking” in that it combines cognition (explanation, evaluation, etc.) and emotion (empathy, sensitivity to others, etc.) in an interdependent relationship (Dewey, 1980). The responsible thinking mode is related to a reflection on social/moral beliefs, rules, actions, values... From the perspective of the development of DCT, the responsible mode appears fundamental because it eventually represents the balance between the right to express oneself and the responsibility to do so with sensitivity; it anchors evaluation of facts, of points of view... in concern for others (Gibbs, 2003; Nucci, 2001; Selman, 1971a, 1971b; Turiel, 2006) and eventually in the common good. The main manifestations of thinking skills of the responsible mode that emerged from the transcripts – from the simplest to the most complex – are: statements, descriptions, explanations, evaluations related to a personal behaviour, to group rules or to social/ethical values.

In all the groups, whether the pupils had one or two years of philosophical *praxis*, the responsible thinking mode was mobilized much less often (between 0% and 28%) than the logical or creative modes. Nevertheless, in three groups (the two 2nd grade groups and the 5th grade group with one year

pupils' age and philosophical *praxis*: two factors that influence the development of critical thinking in children

of philosophical *praxis*), this mode was mobilized in about a quarter of interventions, which represents the highest score obtained for this thinking mode. From this analysis, as was the case previously, we cannot maintain that the age of the pupils was a mobilization criterion, because those from preschool with two years of philosophical *praxis* mobilized the responsible mode more than some groups from elementary school. Neither did the number of years of *praxis* seem to stimulate the mobilization of this mode: there was even a significant decrease in percentages for grades 1 and 5. In this respect, we deem that the topic discussed by the group and the teacher's facilitation are factors that are more likely to exert an influence on his mobilization.

Metacognitive: This mode refers to awareness of a thought ("thinking about thinking") but also, in its simplest expression, to awareness of a task completed, emotion experienced, point of view expressed, etc. The metacognitive mode is fundamental to the sophistication of DCT, because it is the only one that allows for retrospection that eventually leads to self-correction (for a review, see Ku & Ho, 2010). When pupils are young it is appropriate to create situations that allow them to develop this thinking mode and to make them understand that self-correction is a sign of progress rather than error. The main manifestations – from the simplest to the most complex – are: recalling (expressed in the form of a statement) a behaviour, task, emotion, point of view, etc., descriptions related to a task completed, emotion experienced, point of view expressed, etc., evaluations of a perspective, a thought, etc. that lead to correction.

This mode of thinking is scarcely mobilized in the groups with one year of philosophical *praxis*; it is mobilized more in groups with two years of *praxis* (except in one 1st year group). Once again, analyses indicate that the mobilization of the metacognitive mode does not depend on the age of the pupils, since both preschool groups mobilized metacognitive thinking in a percentage that was equivalent or superior to some groups from elementary school. It is possible that the number of years of philosophical *praxis* influences the mobilization of metacognitive thinking, but this would have to be verified



with other groups. Other factors of influence could include, as previously mentioned, the topic discussed or the stimulation of this thinking mode by the teacher.

Table 2. Thinking Modes: Percentage of Mobilization in Class Groups with One and Two Years of Philosophical *Praxis*

Group/Modes	Logical	Creative	Responsible	Metacognitive
Preschool				
1 year of P4C	46%	41%	7%	6%
2 years of P4C	38%	38%	17%	7%
1st grade				
1 year of P4C	39%	41%	10%	10%
2 years of P4C	46%	54%	0%	0%
2nd grade				
1 year of P4C	50%	27%	22%	0%
2 years of P4C	37%	22%	28%	13%
3rd grade				
1 year of P4C	47%	43%	11%	0%
2 years of P4C	44%	31%	11%	14%
4th grade				
1 year of P4C	46%	33%	12%	9%
2 years of P4C	33%	36%	15%	16%
5th grade				
1 year of P4C	43%	27%	22%	8%
2 years of P4C	48%	18%	2%	11%
6th grade				
1 year of P4C	48%	32%	8%	13%
2 years of P4C	n/a	n/a	n/a	n/a

In short, analyses show that the thinking modes are little influenced by factors of age and philosophical *praxis*, with the exception of the logical mode, which is perhaps less accessible to preschool and 1st grade pupils (5 to 7 years of age) than the creative mode, and with the exception of the metacognitive mode, which may be more mobilized among pupils who have two years of P4C *praxis*.

Epistemological perspectives (for detailed percentages, see Table 3)

Egocentricity: This is the perspective that underlies the most simple meanings and representations. It implies certainty as well as dualistic, concrete and not-well-thought-out representations of the world, which are not influenced by divergent points of view. Analysis of transcripts indicates that in this perspective statements refer to the pupil's specific personal experience; are centered on simple units (vs. relationships), are not justified, are without nuance and are formulated in "I" form.

Egocentricity is a perspective that was scarcely mobilized in the groups studied: in preschool, it was mobilized in percentages of 6% and 13%; in elementary school, its mobilization gradually decreased between grades 1 and 6, although it does not disappear completely, as shown in the 6th grade group percentage. The age factor is therefore present. The number of years of philosophical *praxis* does not seem to be a determining factor, since certain groups who have two years of philosophical *praxis* show mobilization percentages for egocentricity that are higher than those who have a single year of experience. It is possible that because DCT is "recursive" (Chandler et al., 2001), pupils who are confronted with the need to solve a complex problem or to define a new concept rely on egocentric representations to begin their research process no matter what their philosophical experience.

Post-egocentricity: This is also a perspective characterized by concreteness and centering, but it underlies a slight sophistication of representation. Pupils' statements are slightly de-centered, referring to the specific experience of a pupil's immediate environment (i.e. family), centered on simple units (vs. on relationships), not justified and generally formulated in "we" form (including self and others) or possessive "he/she" form (i.e. *my brother he is...*).

In the groups with one year of philosophical experience, mobilization of post-egocentricity reaches rather significant percentages between preschool and the 4th grade (with the exception of the 2nd grade); from the 4th grade on, it gradually decreases and is almost absent in the interventions of 6th grade pupils. In the groups with two years of philosophical experience, post-



egocentricity diminishes radically from the 3rd grade – that is a year earlier than in the groups with a single year of philosophical experience. Age therefore seems to be a factor in the development of DCT, as does the number of years of philosophical *praxis*. Regardless of the number of years of experience and regardless even of the group, the post-egocentricity epistemological perspective was mobilized more than the previous perspective, egocentricity, but mobilized less than the following more complex perspective.

Pre-relativism: In this perspective, sophistication of representations starts to manifest itself. Pupils describe (vs. state) their point of view to peers. These points of view underlie the beginnings of generalization, but remain grounded in familiar surroundings (i.e.: they no longer speak of *my* friend, but of *friends*, without however addressing the concept of *friendship*). Points of view are still without nuance or with very little nuance, not justified or with an underlying unsuccessful attempt at justification, which remains implicit or is circular, false, etc. Statements are generally formulated with a general “we” (i.e.: *we must love everyone*) or with a generalized “they” (i.e.: *parents they love their children*).

In groups with one year of philosophical *praxis*, pre-relativism represents the dominant epistemology from preschool to the 4th grade, whereas in groups with two years of *praxis*, pre-relativism appears from preschool to the 3rd grade (ceding its place to relativism in the 4th grade). Here again, results show that age is a factor to be considered in epistemological sophistication, and that the number of years of philosophical *praxis* serves to speed up the developmental process.

Relativism: This is an epistemological perspective that presupposes a *rupture* in the groups’ representations. Pupils seem to become aware that the world is not so simple (good/bad, right/wrong). They seem to be aware that others have different beliefs, points of view, etc., as they listen to others more actively. On the other hand, they want others to understand the meanings of their ideas, hence their statements are more elaborate than in the previous perspectives and they include a justification explicitly articulated (i.e. *childhood & philosophy, rio de janeiro, v.8, n.15, jan./jun. 2012, pp. 105-130. issn 1984-5987 119*

pupils' age and philosophical *praxis*: two factors that influence the development of critical thinking in children

because...). Justifications are stated in the form of concrete and/or incomplete explanations with underlying simple relationships between points of view or contexts (vs. units that are independent from each other); they are still grounded in experience, but with the beginnings of generalization; they are generally formulated in “you”, “we” or generalized “they” form. In this perspective, pupils think by themselves along with their peers, and they enjoy it; they feel valued because they are aware that their thinking is autonomous, original, better articulated and more elaborate than it used to be, and that they are heard by their peers (Gagnon et al., 2011). Teachers also take great satisfaction from this because they realize their pupils can think for themselves thanks to their Socratic maieutics. The risk is that pupils as well as teachers may believe that relativism is the ultimate aim of P4C and the limit to cognitive and epistemological development. In this case, relativism becomes negative since it is no longer a transition toward a more sophisticated epistemology, but rather the final step to be reached – a step which, in addition, may include laxity in which everything is accepted and acceptable, even the unacceptable (Collins, 2004; Comte-Sponville, 2001; Kuhn, 1999).

Relativism is mobilized in all the groups, even the preschool groups. In groups with one year of philosophical experience, the percentage of mobilization of relativism fluctuates between 7% and 46%, without any specific pattern, which could indicate that this perspective has yet to be integrated. In groups with two years of philosophical experience, relativism progresses quite homogeneously from preschool to the end of elementary school; the dominance of relativism over the other perspectives is clearly manifested from the 3rd grade onward. Because of the progressive movement observed in the groups, it can be argued that the number of years of philosophical *praxis* is crucial in stimulating this rather complex perspective.



Table 3. Epistemological Perspectives: Percentage of Mobilization in Class Groups with One and Two Years of Philosophical *Praxis*

Groups/ Epistemological perspectives	Ego- centricity	Post- egocentricity	Pre- relativism	Relativism	Post- relativism/ pre-inter- subjectivity	Inter- subjectivity
Preschool 1 year of P4C 2 years of P4C	6% 13%	17 % 20%	66% 62%	12% 5%	0% 0%	0% 0%
1st grade 1 year of P4C 2 years of P4C	9% 6%	20% 6%	64% 68%	7% 20%	0% 0%	0% 0%
2nd grade 1 year of P4C 2 years of P4C	2% 7%	7% 18%	69% 53%	23% 20%	0% 2%	0% 0%
3rd grade 1 year of P4C 2 years of P4C	0% 2%	25% 2%	60% 38%	13% 45%	0% 12%	0% 0%
4th grade 1 year of P4C 2 years of P4C	1% 0%	10% 2%	39% 32%	41% 47%	5% 18%	1% 0%
5th grade 1 year of P4C 2 years of P4C	0% 0%	9% 7%	50% 25%	24% 41%	17% 27%	0% 0%
6th grade 1 year of P4C 2 years of P4C	1% n/a	1% n/a	41% n/a	46% n/a	10% n/a	0% n/a

Post-relativism/Pre-inter-subjectivity: This perspective illustrates the continuity in the process of de-centering and abstraction, which began in the previous perspectives. It implies that statements are generalized and show the beginnings of conceptualization; they include a justification that is explicitly articulated, presented in the form of a “good reason” (supposing an underlying inference rather than linked to a practical experience), related to peers points of view; they imply the beginnings of a constructive evaluation.

pupils' age and philosophical *praxis*: two factors that influence the development of critical thinking in children

In groups with a single year of philosophical *praxis*, *post-relativism/pre-inter-subjectivity* is not mobilized at all between preschool and the 4th grade, then is mobilized in low percentages from the 4th grade onwards. In the groups with two years of philosophical *praxis*, this perspective starts to become very slightly mobilized in the 2nd grade, and keeps on increasing until it is manifested in nearly 30% of interventions in the 5th grade. Once again, factors of age and philosophical *praxis* seem to be determinant.

Inter-subjectivity: In this perspective, statements are conceptualized; they are presented in the form of questioning or a constructive evaluation of points of view, premises, etc., underlying a search for different meanings (vs. for a single truth) that include an argumentation expressed in negotiation form, are centered on social or ethical preoccupations, sometimes explicitly include self-correction as well as a justification that is explicitly articulated, presented in the form of criteria (subjective or objective), well-developed although not comprehensively, and linked to peer points of view.

Inter-subjectivity was not mobilized in the groups in the current study; although it was mobilized in a previous study (Daniel et al., 2005) in a 6th grade group that had more than two years of philosophical *praxis* with P4C. Age as well as the number of years of philosophical *praxis* could therefore be considered determinants of inter-subjectivity.

In short, results in connection with epistemological perspectives indicate that the age of the pupils and their number of years of *praxis* with P4C are factors that influence the developmental process of DCT. On one hand, the younger groups of pupils do not reach, or hardly reach, the more complex epistemological perspectives, such as *post-relativism/pre-inter-subjectivity*. On the other hand, groups of pupils with two years of philosophical *praxis* mobilize these perspectives faster than groups with a single year of experience.

Discussion/Conclusion

This paper focuses on the study of two factors, children's age and the number of years of P4C *praxis*, and their influence on the development of dialogical critical thinking (DCT).



We used the revisited model of the developmental process of DCT as an analysis grid. The exchanges of 13 groups were analyzed, these groups ranging from preschool to the 6th grade. The groups came from two schools, one with one year of P4C *praxis* and the other with two years.

It emerged from the transcript analyses that when the groups of pupils exchanged, they more or less regularly used four thinking modes: logical (the most mobilized in most class-groups), creative (also frequently mobilized), responsible (hardly at all) and metacognitive (nearly non-existent, mostly in groups with just one year of philosophical *praxis*). Age may have an impact on the mobilization of the logical mode, and the number of years of philosophical *praxis* may have an impact on mobilization of the metacognitive mode, however, in all the cases studied, these factors could not be considered particularly determining.

With regard to the manner (more or less complex) in which these thinking modes were manifested and to the underlying epistemological development, analyses showed that the age of the children and the number of years of P4C *praxis* are two factors that influence the developmental process of DCT. On one hand, the age factor is observable in the lack of mobilization, in preschool and the beginning of elementary school classrooms, of the more complex perspectives (i.e. post-relativism/pre-inter-subjectivity). On the other hand, the impact of the number of years of *praxis* is observable in the increasing sophistication of DCT. In the groups with one year of philosophical *praxis*, the transition from simple perspectives such as pre-relativism (marked by centering and concreteness) to more complex perspectives such as relativism or post-relativism (marked by a degree of de-centering and abstraction) appeared in the 4th grade, whereas in groups with two years of practice it appeared in the 3rd grade, one year earlier.

Results obtained within the framework of this study are very interesting in that they enable us to support the hypothesis according to which not only age, but also the number of years of philosophical *praxis*, seem to have an

pupils' age and philosophical *praxis*: two factors that influence the development of critical thinking in children

influence on the sophistication of pupils' thinking. With this in mind, it would be interesting to pursue this research, in particular by attempting to "isolate" the philosophical *praxis* variable by repeating the studies with pupils who have no experience with P4C. It would also be interesting to collect data from secondary school pupils; this would enable us to further examine the age variable. It would also be highly valuable to examine the critical practices of pupils in other school subjects, such as mathematics, history, ethics, geography, etc. Similarly, in addition to the factors studied here, namely the age of pupils and their number of years of philosophical *praxis*, the sophistication of thinking may depend on various other factors (such as the pupils' knowledge or lack of knowledge of the concept being discussed, their motivation with regard to the topic, the teacher's role) that could be considered for further study.

Concerning this last point (the teacher's role), many studies demonstrate that the teacher's interventions is a factor that has a major influence on the pupils' cognitive development (among others: Berland & McNeill, 2010; for a review: Tabak & Weinstock, 2008)¹³. This relationship between the teacher's types of interventions and pupils' interactions has also been observed in many P4C workshops around the world. For example, when the interaction is of the type "question from the teacher - answer from the pupil - evaluation by the teacher", the pupils understand that they are situated within a traditional context of authority and are led to base their answers on beliefs that are learned and memorized (i.e.: the egocentric epistemological perspectives of our model). On the other hand, when the interaction is left to the pupils, that is, without backup or guidance from the teacher, the pupils do not have the natural reflex to expand their argument or to evaluate the premises of their peers (i.e.: the relativist epistemological perspectives of our model). When the teacher promotes interaction of the "critical dialogical" type among the pupils, their cognitive and epistemological skills are stimulated (i.e.: the inter-subjective

¹³ Other studies also show that the teachers do not generally demonstrate complex epistemological comprehension on individual tests (Olafson & Schraw, 2006; Windschul & Thompson, 2006), which does not inspire them to stimulate these skills in their pupils.



epistemological perspectives of our model¹⁴). By critical dialogical exchange, we mean a philosophical exchange that meets, among others, the following criteria : explicit interdependence among the pupils' points of view, thinking centered around the construction of meanings (*vs.* search for a predetermined truth), justification of points of view using good reasons or criteria, questioning the perspectives, seeking constructive criticisms from peers, acceptance of uncertainty, ethical concern, explicit self-correction, etc. (Daniel et al., 2005). Among the questions the teacher can ask in order to stimulate critical dialogical exchanges among the pupils are: *Who would like to reformulate what has just been said? What do you mean by...? Who can provide a nuance to what y just said? Who can provide a counter-example? Among the criteria we have just named, which seems to be the most reliable or appropriate?, etc.*

In this latter type of interaction, the role of the teacher is that of "guide" (*vs.* "information provider"), that is, the teacher must stimulate doubts or cognitive conflicts among the pupils in order to orient them toward a process of evaluative research, avoid dogmatism, surpass relativism and encourage the mobilization of attitudes associated with active listening and with concern for others. The teacher's role is thus very demanding, since it presumes that the teacher becomes a co-researcher together with the pupils, that he or she promotes both reasoning and knowledge, that he or she pays particular attention to processes as well as to the cognitive, social and ethical skills mobilized by the pupils, that he or she be open to criticism, etc. (Gagnon, 2012).

In our study, the role of the teacher - while it cannot be totally ignored - is not likely to have significantly influenced the results of the analysis since all of the teachers of the groups-classes participating in the study received theoretical and practical training in P4C and had a minimum of 2 years of experience in philosophical guidance. These teachers were therefore comfortable assuming

¹⁴ Note that here again the question of children's ages becomes a factor, since although our experiments have resulted in exchanges of the "quasi-critical dialogical" type among groups of children five years old (Daniel & Delsol, 2005; Daniel *et al.*, 2011), none of the experiments has yet demonstrated that at this age children are capable of exchanging in a "critical dialogical" manner, even if the teacher's intervention tends in that direction.

pupils' age and philosophical *praxis*: two factors that influence the development of critical thinking in children

their role of "guide". The regularity of the epistemological progression among the groups-classes from each school seems to validate this point.

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References

Berland, L. & McNeill, K. (2010). A learning progression for scientific argumentation: Understanding student work and designing supportive instructional contexts. *Science Education. Online*, 766-793.

Burnard, P., Craft, A., Cremin, T., Duffy, B., Hanson, R. Keene, J. Haynes, L. & Burns, D. (2006). *International Journal of Early Years Education*, 14 (3), 243-262.

British Columbia Ministry of Education. (2000). *Le programme du primaire. Cadre d'enseignement* (pp. 36-37). Victoria, B.C.: Ministry of Education.

Camhy, D. & Iberer, G. (1988). Philosophy for children: A research project for further mental and personality development of primary and secondary school pupils. *Thinking*, 7, 18-26.

Cannon, D. (1987). Good reasoning: A reconsideration drawn from experience with Philosophy for Children. *Analytic Teaching*, 8, 30-35.

Cannon, D. & Weinstein, M. (1985). Reasoning skills: An overview. *Thinking*, 6, 29-33.

Caron, A. (ed.). (1990). *Philosophie et pensée chez l'enfant*. Montreal: Agence d'Arc.

Chandler, M., Hallett, D., & Sokol, B. (2001). Competing claims about competing knowledge claims. In B. Hofer, & P. Pintrich (eds.), *Personal epistemology. The psychology of beliefs about knowledge and knowing* (pp. 145-169). New York: Routledge.

Collins, C. (2004) Education for a just democracy: The role of ethical inquiry. Doctoral Thesis. University of South Australia, Adelaide.



- Comte-Sponville, A. (2001). *Petit traité des grandes vertus*. Paris: Seuil.
- Craft, A. (2000). *Creativity across the primary curriculum : Framing and developing practice*. London: Routledge Falmer.
- Cuypers, S. & Haji, I. (2006). Education for critical thinking: can it be non-indoctrinative? *Educational Philosophy and Theory*, 38 (6), 723-743.
- Daniel, M.-F. (2002). *Les contes d'Audrey-Anne*. Quebec City: Le Loup de Gouttière/Michel Cornac.
- Daniel, M.-F. & Delsol, A. (2005). Learning to Dialogue in Kindergarten. A case study. *Analytic Teaching*, 25(3), 23-52.
- Daniel, M.-F., Lafortune, L., Pallascio, R., Splitter, L., Slade, C., & De la Garza, T. (2005). Modeling the development process of dialogical critical thinking in pupils aged 10 to 12 years. *Communication Education*, 54, 334-354.
- Daniel, M.-F. & Gagnon, M. (2011). A developmental model of dialogical critical thinking in groups of pupils aged 4 to 12 years. *Creative Education*, 2 (5), 418-428.
- Daniel, M.-F., Pettier, J.-C. & Auriac, E. (2011). The incidence of philosophy on the discursive and language competencies of pupils aged four years. *Creative Education*, 2, 296-304.
- Darling, L. (2002) The essential moral dimensions of citizenship education: what should we teach? *Journal of Educational Thought*, 36 (3), 229-249.
- Darling, L. (2006). Teaching social studies as if it matters: Young children and moral deliberation. In E. Ross (ed.) *The social studies curriculum: Purposes, problems, possibilities*. Albany: State University of New York Press.
- Dewey, J. (1933). *How we think*. Boston: Heath and Co.
- Dewey, J. (1980). *Theory of Moral Life*. New York: Irvington Publishers.
- Fong, B. (2002). Of character and citizenship. *Peer Review*, 4.
- Freire, P. (1972). *Pedagogy of the oppressed*. New York: Herder and Herder.
- Gagnon, M. (2012). La pratique enseignante du dialogue philosophique en communauté de recherche. In N. Bouchard & M. Gagnon (eds.). *L'Éthique et culture religieuse en question. Réflexions critiques et prospective* (pp. 65-83). Québec: PUQ.
- Gagnon, M., Couture, E. & Yergeau, S. (2011). Pratiquer la philosophie en communauté de recherche au secondaire: quels apprentissages pour les élèves? *Vie pédagogique*, 159. Online:
http://www.mels.gouv.qc.ca/sections/viepedagogique/159/index.asp?page=dossierB_4

pupils' age and philosophical *praxis*: two factors that influence the development of critical thinking in children

Gazzard, A. (1988). Thinking skills in science and philosophy for children. *Thinking*, 7, 32-41.

Giancarlo, C. & Facione, P. (2001). A look across four years at the disposition toward critical thinking among undergraduate students. *The Journal of General Education*, 50 (1), 29-55.

Gibbs, J. C. (2003). *Moral Development and Reality. Beyond the theories of Kohlberd and Hoffman*. Ohio: The Ohio State University.

Golding, C. (2009). Epistemic positions and Philosophy for Children. *Farhang, Journal of the Institute for Humanities and Cultural Studies*, 69, 83-115.

Golding, C. (2009b). "That's a better idea!" Philosophical progress and philosophy for children. *Childhood & Philosophy*, 5 (10), 223-269.

Haroutunina-Gordon, S. (2010). Listening to a challenging perspective: The role of interruption. *Teachers College Record*, 112 (11), 2793-2814.

Hofer, B. & Pintrich, P. (2001). *Personal Epistemology. The Psychology of Beliefs About Knowledge and Knowing*. New-York and London: Routledge. Taylor & Francis Group.

Kennedy, D. (1996). Young children's moves: Emergent philosophical community of inquiry in early childhood discourse. *Critical & Creative Thinking*, 4, 28-41.

King, P. & Kitchener, K. (1994). *Developing reflective judgment: Understanding and promoting intellectual growth and critical thinking in adolescents and adults*. San Francisco: Jossey-Bass.

King, P. & Kitchener, K. (2001). The reflective judgment model: Twenty years of research on epistemic cognition. In B. Hofer & P. Pintrich (Eds.), *Personal epistemology. The psychology of beliefs about knowledge and knowing* (pp. 37-63). New York: Routledge.

Ku, K. & Ho I. (2010). Metacognitive strategies that enhance critical thinking. *Metacognitive learning*, 5, 251-267.

Kuhn, D. (1999). A developmental model of critical thinking. *Educational Researcher*, 28, 16-25.

Kuhn, D. & Park, S. (2005). Epistemological understanding and the development of intellectual values. *International Journal of Educational Research*, 43, 111-124.

Kuhn, D. & Pease, M. (2006). Do children and adults learn differently? *Journal of Cognition and Development*, 279-293.

Kuhn, D. & Weinstock, M. (2001). What is epistemological thinking and why does it matter? In B. Hofer & P. Pintrich (Eds.), *Personal epistemology. The*



psychology of beliefs about knowledge and knowing (pp. 121-145). New York: Routledge.

Kwak, D.-J. (2007) Re-conceptualizing critical thinking for moral education in culturally plural societies. *Educational Philosophy and Theory*, 39, 460-470.

Lane, N. R. & Lane S. A. (1986). Rationality, self-esteem and autonomy through collaborative enquiry. *Oxford Review of Education*, 12, 263-275.

Lipman, M. (1979). Philosophy for Children. *Metaphilosophy*, 7 (1), 17-39.

Lipman, M., A. M. Sharp & F. Oscanyan. (1980). *Philosophy in the classroom*. Philadelphia, PA: Temple University Press.

Lipman, M. (1988). Critical thinking: What can it be? *Educational Leadership*, 46 (1), 38-43.

Lipman, M. (2003). *Thinking in Education* (2nd edition). Cambridge: Cambridge University Press.

Mejia, A. & Molina, A. (2007). Are we promoting critical autonomous thinking? A discussion on conversational genres and whether they can help us answer this question. *Cambridge Journal of Education*, 37 (3), 409-426.

Nucci, L. (2001). *Education in the Moral Domain*. Cambridge: Cambridge University Press.

Olafson, L. & Schraw, G. (2006). Teachers' beliefs and practices within and across domains. *International Journal of Educational Research*, 45, 71-84.

Ontario Ministry of Education. (2005). *Moi, lire ? Tu blagues ! Guide pratique pour aider les garçons en matière de littérature* (pp. 37-40). Government of Ontario. Electronic version.

Paul, R. (1993). *Critical thinking: What every person needs to survive in a rapidly changing world*. Santa Rosa, CA: Foundation for Critical Thinking.

Paul, R. & Elder, L. (2001). *Critical thinking: Tools for taking charge of your learning and your life*. Upper Saddle River, NJ: Prentice Hall.

Peters, M., Smith, M. & Smith, G. (2002). Use of critical interactive thinking exercises in teaching reproductive physiology to undergraduate students. *American Society of Animal Science*, 80, 862-865.

Selman, R. L. (1971a). Taking another's perspective: role taking development in early childhood. *Child Development*, 42, 1721-1734.

Selman, R. L. (1971b). The relation of role taking to the development of moral judgement in children. *Child Development*, 42, 79-91.

pupils' age and philosophical *praxis*: two factors that influence the development of critical thinking in children

Sharp, A.-M. (2008). *The Child as Critic*. New-Jersey: Montclair State University, IAPC.

Tabak, I. & Weinstock, M. (2008). A sociocultural exploration of epistemological beliefs. In M. Khine (Ed.). *Knowing, Knowledge and Beliefs: Epistemological Studies across Diverse Cultures* (pp. 177-195). New York, NY, US: Springer Science / Business Media.

Thayer-Bacon, B. (2003). *Relational "(e)pistemologies"*. New York: Peter Lang.

Thomas, N. (2001). Democratic education: A matter of institutional conscience and skills. *About Campus*, 6, 19-24.

Torff, B. (2006). Expert teachers' beliefs about use of critical thinking activities with high and low advantage learners. *Teacher Education Quarterly*, Spring, 37-52.

Turiel, E. (2006). Thought, emotions, and social interactional processes in moral development. In M. Killen & J. Smetana (ed.). *Handbook of Moral Development* (pp. 7-37). Mahwah, N.-J.: Lawrence Erlbaum Associates, Publishers.

Weinstock, M., Neuman, Y. & Glassner, A. (2006). Identification of informal reasoning fallacies as a function of epistemological level, grade level, and cognitive ability. *Journal of Educational Psychology*, 89 (2), 327-341.

Windschul, M. & Thompson, J. (2006). Transcending simple forms of school science investigation: The impact of preservice instruction on teachers' understandings of model-based inquiry. *American Educational Research Journal*, 43, 783-835.