

On the Foundations of Pierre Zürcher's Holistic Theory of Musical Development

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Abstract

This paper aims to discuss the foundations of Pierre Zürcher's four-stage theory of musical development in neurotypical childhood, which is interesting because it combines Piagetian and Vygotskian concepts. His research is based on his pedagogical experience, which is close to Orff's approach, but diverges on the use of Haeckel's ontogeny-phylogeny recapitulation theory. He opposes three major types of reductionism by proposing a holistic theory that integrates anthropology, musicology, and child development. The concept of cultural transmission is central as the essential social role of the music educator. As a result, he rejects Piagetian functional continuity, structural discontinuity, and the idea of musical skills as a specific developmental domain. He emphasizes the role of the motivation and social context in the acquisition of musical skills. He treats music as an autonomous way of thinking, which should not be reduced to a scientific analysis in non-musical categories.

Keywords: Musical Skills; Musical Development; Reasoning; Ontogeny-Phylogeny; Music Education.

1

Sobre os fundamentos da teoria holística do desenvolvimento musical de Pierre Zürcher

Resumo

Este artigo tem como objetivo discutir a teoria de Zürcher sobre as quatro fases do desenvolvimento musical na infância neurotípica, que é interessante por combinar conceitos de Piaget e Vygotsky. Sua pesquisa se baseia em sua experiência pedagógica, próxima à abordagem de Orff, mas diverge no uso da teoria da recapitulação ontogenética-filogenética de Haeckel. Ele se opõe a três tipos de reducionismo, e propõe uma teoria holística que integra antropologia, musicologia e desenvolvimento infantil. O conceito de transmissão cultural é essencial para o papel social do educador musical. Como resultado, ele rejeita a continuidade funcional e a descontinuidade estrutural piagetianas, e a ideia de habilidades musicais como um domínio específico do desenvolvimento. Ele enfatiza o papel da motivação e do contexto social na aquisição de habilidades musicais, e trata a música como uma forma autônoma de pensar, que não deve ser reduzida a uma análise científica em categorias não-musicais.

Palabras-chave: Habilidades musicais; Desenvolvimento musical; Raciocínio; Ontogenia-Filogenia; Educação musical.

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Introduction

The development of musical skills in early childhood is a concern for musical educators because the order in which the content is taught may lead to inadequate integration in later stages. For example, it is well-known that in the Jaques-Dalcroze method, all theoretical content is presented only after proper sensorimotor skills have been established. Similarly, Piaget's research on the development of *a priori* formal operations suggests that teaching mathematics too early is bound to be more counterproductive than helpful.

Pierre Zürcher represents the distinguished Swiss (or Genevan) school of musical education that goes back at least to Édouard Claparède (1873-1940). He proposes a four-stage theory of musical development in childhood that merges Piaget's and Vygotsky's concepts. It is important to note that Zürcher uses the French term '*temps*' to describe his stages.

In the first stage, Zürcher (2010) emphasizes the use of the voice as a means for the child to express emotions. In the second stage, language and singing play an indispensable role in building interpersonal relations and establishing an intersubjective space. In the third stage, active or enacted thought (*pensée en acte*) creates the basis for socialized behavior. In the fourth stage, the development of operational thought enables the child to participate in musical activities as a cultural domain.

Zürcher's theory is based on decades of direct pedagogical experience combined with abstract theoretical reflection. He has run a school of musical initiation since 1970, the *Atelier Musical Pierre Zürcher*, which has provided him with a number of cases to study (<http://www.usagemusical.info/BesoinDe.html>). On social media, he has a channel on YouTube (<https://www.youtube.com/@pierrezurcher1442>) and Facebook (<https://www.facebook.com/pierre.zurcher.3>). Although his book is relatively short, it is also very dense, making it impossible to address all of the issues he raises in each of his four stages. Therefore, in the following sections, I will have to limit myself to examining the foundations of Zürcher's stage 1.

A Swiss music teacher-researcher's quest for a holistic model

In the introduction to his book, Zürcher formulates his child-centric research question in the following terms: "How does the child integrate into musical culture?" This frames the problem of

the child's musical development in Piaget's terms of assimilation and accommodation but with an apparent emphasis on the latter. As is well known, Piaget understood the individual organism's adaptation to its environment by dynamically balancing these two complementary processes. During assimilation, the individual would incorporate information from the external environment into her action schemata. An example of this embodied cognition could be a child's hand shape as she tries to grasp a material object. She may have previously assimilated a hand shape that was effective for holding plastic balls. But if she all of a sudden wants to grasp an object with a different shape, such as a towel, she will have to accommodate that action scheme to the new object. Similarly, Zürcher's research question acknowledges that it is the child who will have to accommodate to the musical culture he or she is raised in. The child will also have to assimilate musical content from that culture, and not the other way around. Therefore, the relation between the child, on the one hand, and the society's culture, on the other hand, is asymmetric.

Avoiding the empiricist “sponge model”

However, Zürcher is looking for a better theory that articulates individual and collective development or, respectively, ontogeny and phylogeny. The first one he explicitly rejects is what he calls the “sponge model.” According to this theory, the child arrives in the world basically empty, like an empiricist “blank slate” as extensively critiqued by Steven Pinker (Pinker, 2002). Therefore, the child's musical development will consist mostly of a process of assimilation of content from the surrounding culture. Zürcher follows Kant's and Piaget's critique of empiricism: for our experience to be possible as something structured at all, certain preconditions are logically necessary. For example, it is necessary that space and time be given as *a priori* forms of intuition. Although the intuition of spacetime may undergo change as a temporal process and arise with experience, it is neither derived directly from the experience provided by our external senses nor justified by it.

In addition, Zürcher wants to uphold Piaget's constructivist idea that mediates between the extremes of both the empiricist blank slate on the one hand and the pre-formist innatism (or nativism) on the other. As is well known, the constructivist working hypothesis is that external sensory input alone cannot generate the *a priori* spatiotemporal and conceptual framework that structures experience. An already given *a priori* framework

is (transcendentally) necessary, as Kant would have argued. However, in contrast to Kant, Piaget showed that the *a priori* structure is neither static nor predetermined, but undergoes a logical, plastic, and dynamic growth that incorporates both internal and external experience, making it “impure,” that is, both plastic and influenced by experience. On the one hand, structuring *a priori* form remains relatively distinct from the rest of the assimilated mental content it organizes. On the other hand, it also accommodates plastically to the cognitive demands it is subjected to. This impure *a priori*, which Kant attributed only to empirical concepts, develops according to Piaget in pre-verbal (or intuitive) action, interaction, and interpersonal communication, and only later becomes fully verbalized.

According to Zürcher, due to a lack of epistemological self-criticism, musicology, music psychology, and music education have all remained addicted to the mistaken empiricist view that logic somehow emerges from sensory experience. This misunderstanding, he submits, is untenable. In this sense, he is close to Richard Taruskin’s explanation of musical modernism:

Like all utopian ideas, modernism is basically optimistic. The notion that composers are free to organize their music in unprecedented ways and that it is up to audiences to adapt to them is based on a “behaviorist” psychological model. Such a model assumes that the mind is a *tabula rasa*, a clean slate on which experience is inscribed and reinforced by practice. The mind’s activities are conceived as responses to external stimuli, and forms of behavior can be learned, according to this theory, through positive or negative reinforcements (a.k.a. rewards and punishments). Serial music, or any other kind of highly structured music, however novel, is no less intelligible than tonal music, on this model; it is just that listeners have less practice with it. This is the model of mental behavior associated with B. F. Skinner (1904–90), one of the most influential psychologists of the twentieth century, whose theories had a profound impact on modern educational methods—an impact that coincided, as it happened, with the heyday of academic serialism. (Taruskin, 2009b, p. 450)

Although Piaget often criticized apriorism of the static Kantian kind, his research in genetic epistemology suggested the concept of an impure *a priori* as described above, which begins intuitively with sensorimotor schemata and later becomes verbal.

Zürcher does not use this Kantian terminology but correctly appeals to Piaget’s distinction between perception and action. While empiricists and positivists treat logic as tautological knowledge and try to derive it or ground it, in perception, Piaget (1950) proposed that action and the coordination it gives rise to could, in principle, build an impure pragmatic *a priori*. Actually, he distinguished between apriorism, on the one hand, as a non-

genetic approach and pragmatism and conventionalism as genetic approaches. From the empirical or naturalized perspective he favored, Piaget expected an *a priori* framework to present itself regardless of the input provided by the external senses. Instead of construction, we would observe maturation accompanied by moments of self-consciousness regarding mental functioning.

Quant à l'apriorisme, il est évident que s'il était vrai, l'étude génétique en découvrirait le bien-fondé sans sortir du développement comme tel. Un cadre *a priori* se reconnaîtrait, en effet, sans difficulté au fait qu'il ne se construirait pas en relation avec l'expérience, mais s'imposerait en fonction d'une maturation interne progressive. De plus, à cette maturation psychobiologique révélée par l'analyse du comportement correspondrait, du point de vue mental, une prise de conscience brusque ou graduelle, procédant par réflexion de la pensée sur son propre mécanisme.¹ (Piaget, 1950, p. 33)

The difficulty is that Piaget and Zürcher are mainly concerned with neurotypical development. For children in the autistic spectrum, cognitive rigidity may emerge as a maturing *a priori* framework very similar to what Piaget described above. According to Dorita Berger's research (Berger, 2016), music-based interventions guided by Emil Jaques-Dalcroze's Eurythmics can assist neurodivergent persons in overcoming functional challenges.

Much as philosophical idealism, which denies the existence of an external world independent of the senses, can be related to a psychological difficulty in constructing object permanence at the end of the sensorimotor stage, empiricism can be associated with unstructured preoperational thought. Zürcher points out that the empiricist perspective generates pedagogical approaches that treat the child like a sponge who has to passively assimilate external content. He rejects both Roger Bastide's "acculturation" and the Anglophone "enculturation" concepts. In musical pedagogy, he claims, empiricism emphasizes the accumulation of experience as a precondition for the child to assimilate the tonal system:

En effet, le credo empiriste considérant la pensée comme conséquente à un cumul des données sensorielles reste très vivant dans le domaine de la musicologie. D'ailleurs, une part de la psychologie de la musique repose plus ou moins implicitement sur sa reformulation "moderne": au travers du terme

1 "As far as apriorism is concerned, it is clear that if it were true, genetic research would be enough to prove its validity without involving development as such. An *a priori* framework would be easily recognizable by the fact that it would not be constructed through embodied experience, but would force itself upon our cognitive development by a gradual internal maturation. Moreover, this psychobiological maturation manifested in behavioral analysis would correspond, from a mental point of view, to gaining a sudden or gradual awareness by reflecting on the mechanism of thought itself." (my translation)

d'acculturation emprunté à Bastide, on postule un transfert de la culture musicale vers l'enfant par le biais d'une imprégnation perceptive incidente. Précisons encore que les anglo-saxons utilisent le terme enculturation qui, en tendant à se répandre en français, permet de contourner l'équivoque liée au a initial loisible d'être interprété comme privatif. Mais le principe demeure: on continue de percevoir l'enfant comme une éponge.² (Zürcher, 2010, p. 8)

As our author points out, when we conceptualize children as sponges, we are denying them any predisposition to culture. Contrary to this denial of human nature, Zürcher is convinced that mere exposure and perception are not enough for the child to grasp tonal relations. This suggests that tonal relations result from the active construction of what we can call an impure pragmatic *a priori*. This is a first point of major importance because it places our author favorably within the Kantian aesthetic tradition as defined by Otfried Höffe (2014), Piero Giordanetti (2005), and Roger Scruton (1999).

Haeckel's and Orff's Ontogeny-Phylogeny (O-P) Model

6

The second model Zürcher addresses in this regard is Ernst Haeckel's (1834-1919) hypothesis that "ontogeny reproduces phylogeny." Individual embryonic development (ontogeny) is a process that can be observed in several animals. It can be known. In contrast, biological evolution (phylogeny) requires theoretical reconstruction, as it happened millions of years ago, so it is relatively less known. In his book on the subject, Stephen Jay Gould acknowledges that Piaget was influenced by Haeckel, but did not adopt his hypothesis uncritically:

2 "Indeed, the empiricist credo, which considers thought to be the result of an accumulation of sensory data, remains very much alive in the field of musicology. Moreover, a part of the psychology of music is based more or less implicitly on its "modern" reformulation: by using the term acculturation borrowed from Bastide, we postulate a transfer of musical culture to children through incidental perceptual immersion. It should also be noted that the Anglo-Saxons use the term enculturation, which, as it tends to spread in French, allows us to avoid the ambiguity associated with the initial "a," which could be interpreted as privative. But the principle remains: we continue to perceive children as sponges." (my translation)

Piaget was trained as a paleontologist during the heyday of Haeckelian recapitulation (he wrote his dissertation on Jurassic gastropods from France). His pronouncements seem to have a Haeckelian ring—though precision and clarity are not Piagetian hallmarks. It would be reasonable to assert that Piaget studies the ontogenesis of concepts in children because, prompted by his paleontological training in the Haeckelian mode, he believes that children provide the only access to a more interesting question with no direct answer: how, historically, did we learn to think and reason? But this assertion would be at least half wrong. Piaget believes in parallels between ontogeny and phylogeny, but he denies Haeckelian recapitulation as their mechanism. (Gould, 1977, p. 144)

Similarly, Zürcher's view on the O-P model is rather ambivalent. On the positive side, he considers it to be not necessarily false and acknowledges that it can even be potentially useful for coherent pedagogical applications. However, on the negative side, he also recognizes that (a) it has by now lost its heuristic utility and that (b) it does not adequately distinguish between nature and culture.

Our author's main concern is that Haeckel's hypothesis was overly influential among theorists of music pedagogy. In particular, he mentions Carl Orff (1895-1982), who postulated that the minor pentatonic scale was humanity's phylogenetic musical root or archetype, waiting to be internally reactivated in the child's musical development (ontogeny). Once again, we find a similar use of the O-P model in music history by Richard Taruskin (Taruskin, 2009a, p. 360), who criticizes the attempt by modernist historiographers to extrapolate Arnold Schoenberg's individual development as a composer into a general phenomenon of music history.

First of all, it is important to notice how the O-P model differs radically from the sponge model. The O-P model establishes a vital connection between the individual and the species, the microcosm and the macrocosm (Gould, 1977, p. 13). It involves an internal dynamic that can be both biological and cultural. The individual recapitulates the history of the species. In contrast, the sponge model treats the individual as an empty receptacle that passively assimilates the content provided by the surrounding culture, without involving any hereditary or biological aspect.

Zürcher advocates drawing an *a priori* conceptual distinction between pedagogical coherence, which he concedes to Orff, on the one hand, and the scientific truth of developmental psychology, on the other hand.

He objects that, from an empirical point of view, Orff's version of Haeckel's thesis is refuted by his (Zürcher's) experience as a music teacher. At his music school, he observed that most Western (i.e., European and American) children prefer

the major diatonic scale. He claims that if non-diatonic structures are at all used by such children, this cannot be explained by a "genetic" cause, a term that I assume he uses in a biological sense.

Zürcher suggests that the cause would be rather of a "functional" kind, but he does not explain what he means by that until perhaps later. It seems that he understands the term 'functional' to be related to the social or cultural aspect of musical development. If so, it would mean that, for example, a child singing a Phrygian mode or melodic minor scale would do so because of its prevalence in his or her culture.

Thus, Zürcher considers Orff's thesis about the minor pentatonic scale to be empirically false. However, he agrees with Orff that (1) there is an internal dynamic (phylogeny) operating in children (ontogeny) to make them prefer the major scale and that (2) Orff's pedagogical practice is coherent with his theoretical assumptions despite his mistaken hypothesis regarding the minor pentatonic scale as a musical archetype.

In other words, Zürcher frames the problem of musical development and education as a process of integrating an individual into a wider system, namely the culture into which the child is born. He raises the biological problem of the relation between ontogeny and phylogeny, but the connection between them remains unclear. What is the internal dynamic mechanism underlying musical development? Why should individual musical development mirror music history? Associating them is rather awkward because ontogeny tends to vary so much from case to case. For example, musicians frequently talk about their personal influences, and they are never the same, even when they belong to the same culture. The attempt to identify phylogeny with music history is also of doubtful value because the former refers to genetic causes in a biological sense and the latter to concrete and contingent cultural effects of those causes:

La musique occidentale a une histoire, et personne ne songerait à contester cette éventualité, encore que si on s'accorde sur ce qui s'est passé durant un millénaire dans le champ de la musique, on sait peu sur ce qui anime le changement. La réflexion sur l'historicité musicale entraîne inévitablement une question connexe, celle de la possibilité d'une mise en parallèle des évolutions générales et individuelles. En effet, s'interroger sur la nature des changements intervenant pour différencier progressivement le contexte musical d'une époque avec celle qui la précède conduit à faire le rapprochement avec les changements dans la relation à la musique que chacun de nous vit dans le cours de son existence. Mais cette évolutivité individuelle ne doit pas se confondre avec l'appropriation musicale intervenant durant l'enfance. Il y aurait alors d'un côté une transmission de savoir, donc adaptation à des interactions sociales, et de l'autre une dynamique propre au sujet, l'entraînant à modifier sa demande envers la musique. Certes, cette

“appétence” varie largement au gré des individualités, mais ne remet pas en cause l’existence d’une petite histoire de la musique, s’intégrant dans la grande.³ (Zürcher, 2010, p. 12)

Three types of reductionism: physicalistic, pedagogical, and biological

Of course, overcoming empiricist assumptions requires a new theoretical approach. Zürcher regrets that Piaget's distinction between figurative and operative activities was not sufficient to halt the empiricist promotion of reductionist attitudes regarding music. In its usual meaning, reductionism implies a simplification of a phenomenon and a removal of explanatory schemata that would account for it. A classic example in the history of modern science was the elimination of Aristotle's teleological explanations concerning physical phenomena because mechanical or efficient causes were sufficient, and no idea of a larger purpose was considered necessary anymore.

Concerning music and music education, Zürcher identifies at least three types of reductionism: (a) physicalism, (b) pedagogical individualism, and (c) biological determinism. Like Roger Scruton (Scruton, 1999, p. 19), who distinguished between sound and tone, Zürcher notes that music's cultural dimension is lost by treating it as mere sound. This physicalistic reductionism misses the aesthetic dimension of music as an art. Reductionism of the pedagogical type manifests, according to our author, as an exaggerated focus on the individual child. It neglects the social context in which the child is developing. In addition, it is insufficiently critical towards pedagogical standards that originate from society's expectations. Last but not least, biological reductionism emphasizes heredity, thereby suggesting deterministic constraints to human development. In addition, it produces what Zürcher calls gratifying ideas or wishful thinking to explain cases of special development (giftedness) and creativity.

3 "Western music has a history, and no one would dispute that fact, although while there is agreement on what happened over the course of a millennium in the field of music, little is known about what drives that change. Reflection on musical historicity inevitably leads to a related question: whether it is possible to draw parallels between general and individual developments. Indeed, questioning the nature of the changes that gradually differentiate the musical context of one era from that of the previous one leads us to draw parallels with the changes in our relationship with music that each of us experiences in the course of our lives. But this individual evolution should not be confused with the acquisition of musical skills that takes place during childhood. On the one hand, there is the transmission of knowledge, and therefore adaptation to social interactions, and on the other, there is a dynamic specific to the individual, leading them to change their demands for music. Admittedly, this "appetite" varies greatly from one individual to another, but it does not call into question the existence of a small history of music, which is part of the larger one." (my translation)

To counter reductionism, Zürcher stresses the importance of integrating our theories of culture, music, and child development. His self-admittedly ambitious goal is to produce a holistic theory that consistently encompasses and articulates all these phenomena. To achieve his aim, he relies on empirical data acquired during his experience as a music teacher, in which he performs the self-described role of a cultural transmitter, as he puts it. He believes that his position as a teacher enables him to better verify empirical hypotheses that would otherwise remain speculative.

The concept of musical transmission

In addition to rejecting empiricism and reductionism, Zürcher has to struggle with further conceptual tasks before he can interpret his data. In his view, the concept of musical transmission is challenging because it raises the anthropological issue of human culture in general.

Concerning the concept of culture, he acknowledges that it encompasses a wide range of phenomena, but he does not distinguish between complex and complicated systems and uses both terms interchangeably. Therefore, his concept of culture remains rather unclear, but it seems more complex than just complicated. Complicated systems can be understood mereologically, on the basis of their parts. In contrast, complex systems will produce unpredictable outcomes as they adapt and develop. As we have already seen above, Zürcher advises against reducing the concept of cultural transmission to either education or genetics, so it is apparent that he is interested in complexity.

According to our author, the issue of cultural transmission is a process that harks back to the most ancient condition of humanity, in which artistic aptitudes were only acceptable if performed as social functions. He notes a stark contrast between the high appreciation of music in society, on the one hand, and the low social status of musicians on the other. What he calls rewarding ideas and magical thinking make up a substantial part of the misunderstanding of the concept of cultural transmission.

To overcome this situation, he proposes to use Karl Popper's falsificationist epistemology and Lev Vygotsky's interactionism. Zürcher calls for the development of richer explanatory principles that would do justice to the complexity involved in musical transmission. He admits, though, that these approaches

were developed outside the musical world and that they are not easy to apply to music.

The first reason for this difficulty in applying falsification epistemology and interactionism to the concept of musical transmission is, in Zürcher's view, the fact that music is essentially cultural, as opposed to natural or biological. He sees music as an intangible and vanishing phenomenon that is related to persons and artifacts. He also mentions an intergenerational responsibility to transmit the musical culture that we have been entrusted with. In this way, he conceptualizes musical culture as a fleeting environment that surrounds groups and individuals. However, he stresses the power of music to affect social relations and individual life despite its evanescence.

Zürcher draws a distinction between treating music as an object of thought, which he considers to be a mistake, and as a way of thinking: "De fait, il s'agit de se souvenir sans cesse que la musique n'est pas un objet de la pensée, mais elle-même mode de penser"⁴ (Zürcher, 2010, p. 12). He claims that to understand the process by which music is transmitted to the child, it must be conceptualized as a way of thinking.

A more problematic point arises when Zürcher emphasizes the need to examine the relation of music with itself by means of its own history. He seems to be concerned with providing causal explanations of change in musical history. He also wants to relate history, which is cultural, to the phylogeny-ontogeny issue, which is essentially biological. This contradicts his earlier anti-reductionist insistence that music is only cultural and not biological. It also introduces the awkward problem of trying to relate historical changes in musical taste with the process we go through as individuals in our musical development. In this way, Zürcher tends to identify the history of music with phylogenetic development, apparently without realizing that each requires different explanatory frameworks.

Moreover, he warns against identifying ontogeny with the set of musical skills we actually acquire during childhood. Zürcher justifies this by distinguishing between (a) an external (or exogenous) transmission of musical knowledge, which requires the individual to accommodate to society, and (b) the individual's own internal dynamic, which would regulate his or her interest in the content. His point is that individuals may, according to their interests, acquire more or fewer musical skills. However, he postulates that there is always what he calls a "small history of music" within a "larger history of music". In other words, contingent, variable, and concrete results in musical

4 "In fact, we must constantly remind ourselves that music is not an object of thought, but rather a way of thinking in itself." (my translation)

development cannot be used as evidence to refute his assumption that phylogeny contains ontogeny. Besides identifying history and biology, which confuses their respective different explanatory frameworks, Zürcher, contrary to Popper, removes the ontogeny-phylogeny parallelism thesis from the realm of empirical falsification. In this way, it becomes a dogmatic theoretical assumption, which is anything but based on evidence but is used to interpret experience.

Nevertheless, Zürcher frames his discussion as an investigation into the relation between musical ontogeny and phylogeny in which neither is primary. He suggests that a holistic approach would be the best to provide explanations that integrate both individual and social aspects. In other words, Zürcher seems to believe that abandoning the ontogeny-phylogeny parallelism thesis would compromise his attempt to articulate psychological and sociological components in his account of children's musical development. Unfortunately, this is somewhat exaggerated. It is not logically necessary to postulate parallelism between the micro and macro levels to conceptually articulate them (Gould, 1977). Moreover, the causal processes involved may be significantly different and require the construction of explanatory schemata using only biological concepts, only personalistic concepts, or both kinds.

To recapitulate, Zürcher's critique was that Orff, despite the consistency between his theory and his pedagogical practice, had mistakenly postulated the minor pentatonic scale as a phylogenetic structure that should be reactivated in the child's musical education. In Zürcher's experience, most children responded better to the major diatonic scale. This would constitute scientific evidence against Orff's phylogenetic hypothesis. However, Zürcher wants to maintain Orff's ontogeny-phylogeny parallelism and pedagogical consistency. In this way, he remains dependent to a significant degree on Orff's approach, notwithstanding his appeal to Popper and Vygotsky.

Zürcher's method of pedagogical research

In spite of the wide scope of Zürcher's theoretical project, his work is based on his experience as a musical educator. In this sense, it seems fair to say that he is conducting pedagogical research. He understands Pedagogy as an applied science based on the experimental practice of individual educators. He distinguishes between two kinds of knowledge. One is the subjective experience of the educator. The other is what he calls constituted or institutional knowledge, which is socially

approved to be transmitted to the next generation. In his view, Pedagogy takes for granted that this constituted knowledge is transmitted by the teacher to the student. A second assumption Pedagogy makes is normative and concerns not only content but also teaching style.

Music educators are confronted every single day with practical challenges that demand that they adapt their practices. Zürcher contrasts this change in personal educational practice to constituted knowledge, which is inflexible and is expected to be transmitted to the next generation. This raises the issue concerning how much, if any, of the teacher's reflected pedagogical experience can fit into what has been pre-defined as constituted knowledge. Zürcher also mentions the confrontation, as he puts it, between this assigned musical content (for example, the names of notes, rhythms, etc.) and the concrete experience of teaching it to children.

At some point, argues Zürcher, this institutionalized knowledge has to be reconsidered in light of music teachers' cumulative experience. When faced with assumptions concerning the acquisition of musical skills that fly in the face of pedagogical experience, counter-hypotheses have to be developed, regardless of how intimidating this might be to the music teacher. He proposes that an alternative model be developed as a working tool to see whether it produces a more coherent explanation and interpretation of observed facts.

In other words, Zürcher's method, as he describes it in this section, is empirical because it is based on his pedagogical experience, but it is also reflective, in that he intends to revise concepts and theoretical assumptions that are not aligned with what he perceives as effective pedagogical practice. In principle, this is all reasonable and to be expected. However, it is unfortunate that he clings to the concept of transmission. This term understandably suggests that the teacher carries something, like a tradition, that can be passed on to the student. In practice, though, what actually happens is that the teacher has built up skills, and students are building up their own, as it were, in a parallel process of consultation. The violin teacher has to be able to demonstrate how to make a staccato bow stroke, but he cannot "transmit" that skill to the student as if he were to give her a new set of strings.

Zürcher's rejection of Piagetian functional continuity and structural discontinuity

The first surprising, perhaps shocking, result of Zürcher's empirical-reflexive method is that he rejects Piagetian functional continuity and stages (structural discontinuity). He claims that in his pedagogical experience, he has only observed functional discontinuity. Instead of stages, he distinguishes what he calls 'temps' in French, which literally means time or moment. This creates a few conceptual confusions. It reinforces the inconvenient tendency of linking developmental stages to chronological age. Piaget was not opposed to discontinuity in general but saw it occur between stages, which is why he called it structural discontinuity. Zürcher does not address Piaget's concepts of functional invariants, such as adaptation and organization. As is well known, Piaget understood adaptation as a dynamic equilibrium between assimilation and accommodation. Within each structurally stable stage, Piaget claimed to have observed a developmental process marked by functional continuity of cognitive abilities. After undergoing sufficient assimilation and accommodation, a majoring equilibration became possible, which generated a logically necessary cognitive structure. However, due to the reorganization implied in this process, functions of the previous stage underwent a transformation. This caused structural discontinuity.

Zürcher says that his teaching experience has led him to adopt what he calls an inverse perspective. Instead of trying to establish a connection between musical behavioral patterns and a developmental cognitive stage, he sees a central role in conation. In Zürcher's experience, what the children want, what traditionally is called the will, is critical to mobilize whatever musical skills are available at the degree of development they find themselves in. He claims that musical development does not happen as a linear and continuous cognitive process. It is rather on the basis of spontaneous and voluntary desire for cultural appropriation and social integration that the children organize their available musical skills.

Le grand enseignement que m'ont progressivement imposé les années d'observation des conduites musicales enfantines, est celui de la discontinuité fonctionnelle prévalant à la construction du musical. J'ai en effet été contraint de renoncer à l'idée confortable d'un développement musical qui déploierait de manière linéaire ses fonctionnalités spécifiques. Le modèle qui s'est progressivement imposé résulte d'un renversement de perspective. Il n'est alors plus question de relier les conduites musicales à un degré général de développement, mais de prendre acte d'une volonté d'appropriation conduisant à des

conduites empruntant aux fonctionnalités disponibles dans le moment. Il résulte de cette approche une distinction de périodes, fonctionnellement spécifiques, se succédant pour que se constitue la pensée musicale.⁵ (Zürcher, 2010, p. 14)

Therefore, Zürcher distinguishes between four stages of musical cognitive development. In the first stage, children accommodate their communicative functions to their environment. This enables them to acquire musical agency and intentionality. In the second stage, linguistic activities provide the framework in which collaborative vocalizing can generate musical forms. In the third stage, this basic vocal musicality is connected to coordinated action, which engages organized and regulated motor skills. In the fourth stage, music ceases to be just a mental construct. Children gain access to the tonal system and become participants in musical culture by interacting with others.

In this way, Zürcher's theory acknowledges the biological basis of musical development and treats social interaction as its guiding force. However, he believes that the status of his theory should be that of a postulate and mentions Vygotsky's theory positively because it places social interaction as an underlying assumption. The problem is that if Zürcher wants to start from an empirical basis, he should let social interaction be demonstrated by his naturalistic observation. By postulating it as an assumption, he begs the question (*petitio principii*) and cannot demonstrate it without circularity. He seems to be more concerned with how an inadequate theory can prevent a proper understanding of musical development. He praises Vygotsky's emphasis on the bidirectional relationship between children's mental activity and their cultural environment.

Survival as the sociobiological foundation of musical development

According to Zürcher, children lack any innate musical skills, or functions as he calls them, as a specific domain. Children have to contend with a challenging, pre-existing musical environment.

5 "The main lesson that years of observing children's musical behavior have gradually taught me is that functional discontinuity prevails in musical development. I have been forced to abandon the comfortable idea of musical development unfolding in a linear fashion, with specific functionalities emerging one after another. The model that has gradually emerged is the result of a reversal of perspective. It is no longer a matter of linking musical behavior to a general degree of development, but rather of acknowledging a desire for acquisition that leads to behaviors that borrow from the functionalities available at the moment. This approach results in a distinction between functionally specific periods that follow one another in order to constitute musical thought." (my translation)

In Piagetian terms, babies at birth cannot assimilate a dimension of their environment, which, in his view, is unforeseen in its full complexity. However, Zürcher believes that inherited biological mechanisms required for survival are sufficient for children to assimilate, accommodate, and hence adapt to their unexpected musical environment. In addition, he emphasizes the importance of social interaction as a necessary precondition for survival. In this sense, he has to assume that sociality is innate.

Final Remarks: Science or Philosophy?

In closing, it is important to note that Zürcher's first stage of musical development contains several further components, such as the emergence of musical behavior, that deserve careful exposition and discussion. However, attempting this here would take more space than is available. A considerable difficulty is created by our author's commitment to an all-encompassing theory. This is what Piaget (1950) pointed out as a hallmark of Philosophy. While scientists limit themselves to specific sections of reality and follow a piecemeal approach, philosophers see themselves compelled to interconnect everything:

16

Mais, s'il n'y a pas de frontière fixe entre les questions philosophiques et scientifiques, l'esprit dans lequel on les traite demeure essentiellement distinct, du fait même que, dans le second cas, on s'efforce de faire abstraction de l'ensemble des autres problèmes, tandis que dans le premier, il s'agit au contraire de relier tout à tout, sans que l'on ait le désir, ni même le droit, de pratiquer de telles coupures. On pourrait presque dire, sans y mettre de malice, que le philosophe est un théoricien qui se trouve obligé de s'occuper et de parler de tout à la fois, tandis que l'homme de science s'astreint à sérier les questions et se donne ainsi le temps de trouver une méthode particulière pour chacune. Là est donc le noeud du problème.⁶ (Piaget, 1950, p. 14)

In other words, the problem with Zürcher's effort is that theoretical integration is a logical-conceptual task and not just a matter of empirical verification. An example of this epistemological misunderstanding is his attempt to oppose reductionism by appealing to the "fact" that music is culture. The problem is that conceptual disputes cannot be solved by mere appeals to facts, for they depend on what followers of

6 "While there is indeed no fixed boundary between philosophical and scientific questions, the spirit in which they are treated remains, however, essentially different, precisely because in the latter case, we strive to dismiss all problems that are not directly relevant to the issue at hand, whereas in the former, on the contrary, the aim is to connect everything to everything else, without any desire, or even the claim, to draw such distinctions regarding relevance. One could almost say, without malice, that the philosopher is a theorist who is obliged to deal with and talk about everything at once, while the scientist forces himself to sort questions into categories, thus giving himself time to find a particular method for each one. Therein lies the crux of the problem." (my translation)

Wittgenstein's late philosophy call the "grammar" of conceptual terms. If a speaker chooses to use the term 'music' in the same way he uses 'sound,' it is of no use to point out the sociolinguistic "fact" that music is said to be a part of culture. Empirical observations about the use of general terms (nouns, for example) are not sufficient to establish normative logical-conceptual relations. What is needed is an agreement between speakers as to how they ought to use conceptual terms such as 'music' or 'sound.' This requires negotiation at a normative level (Baker & Hacker, 2005, p. 291), in which the deontic operator 'ought' indicates a weak demand and 'should' indicates a strong one (Ros, 1990, p. 145).

Another difficulty is created by his insistence that it is necessary to enquire what music's function is before trying to define it. In other words, he claims that a functional definition must precede a nominal definition. But if I do not know what music is, how can I determine its function? And what is a function after all?

When Zürcher says that music is a way of thinking and not an object of thought, he seems to be emphasizing music-making as a cognitive activity, which is acceptable. However, it is not necessary to reject the idea of music as an object of thought. When we conceptualize music as a cognitive activity, we are also treating it as an object of thought. Therefore, this opposition is not convincing.

Last but not least, it is rather complicated to speak of music as having a reflexive relation to itself, as it is not a person, but an activity. The question could be formulated in personalistic terms: "How do we, as persons, reflect on musical transmission in history?"

In spite of these conceptual difficulties, which cannot be solved empirically or scientifically, but require argumentation, Pierre Zürcher's theory of musical development is a significant contribution to the field and a worthy continuator of one of Europe's most respected educational traditions.

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