# Chapter 18:

# Expanding Student Agency in the Introductory Psychology Course: Transformative Activist Stance and Critical-Theoretical Pedagogy

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## Abstract

This chapter seeks to expand current understanding of student engagement, which is the cornerstone of student-centered approaches. Our contention is that despite advances spurred by the education reform movement, active engagement remains under-theorized and, as a result, related practical implementations for pedagogy remain stalled. Employing the Transformative Activist Stance approach, we demonstrate how an alternative critical-theoretical pedagogy creates conditions for meaningful teaching/learning that relies on and spurs learners’ agency. In this pedagogical model, knowledge is presented as embedded in sociocultural practices, made accessible through interrogation and active exploration by learners, and critically reliant upon learners’ own stances and future-oriented pursuits. We illustrate this approach with the topic of nature versus nurture in an introductory psychology course at a community college. This model is particularly germane to empowering minority students from underprivileged backgrounds as it spurs critical engagement to interrogate ethical-political implications of knowledge for promoting equity and diversity versus legitimizing inequality and social stratification.

## Introduction

In this chapter we examine the role of curriculum design in supporting student-centered pedagogy in terms of providing tools for agentive learning. Specifically, we offer steps to promote meaningful, engaged, and agentive learning in an introductory course in psychology. Our contention is that, despite advances spurred by the liberal education reform movement, especially in moving towards connecting learning and identity development while focusing on student-centered approaches (Baxter Magolda, 1999; Keeling, 2004), such notions as active engagement of “the whole student” are still largely under-theorized and therefore, their practical implementation remains stalled. This exacerbates significant gaps between student-centered pedagogy and disciplinary knowledge construction. In our view, extant guidelines for undergraduate psychology teaching (e.g., APA, 2013; Halpern, 2010) need to be further developed, including the advancement of more solid theoretical foundations for integrating teaching with agentive learning and development. Still missing from the literature are practical and efficient guidelines to resolve tensions between student-centered pedagogy and teaching disciplinary content in ways that are relevant and meaningful to students. For example, student-centered approaches in higher education commonly result in teaching practices that narrowly focus on displacing lecturing with group work. Often, this leads to a lack of a systematic introduction into disciplinary knowledge (to avoid top-down knowledge transmission), which risks impoverishing the conceptual tools at the students’ disposal.

In addition to the pedagogical problems in current theory, a curricular shift is needed. Attention to integrating curriculum design and progressive pedagogy has become paramount in light of the recognition that “psychology has traditionally presented a culturally limited perspective of human beings”, as “culture, ethnic minority groups, gender, sexual orientation, and disability were often viewed as peripheral or outside of the mainstream of psychology” (Sue, 2003, p. xvii). Therefore, recent scholarship on psychology teaching has made a compelling case for infusing curricula with diversity topics. Importantly, APA has also committed to promoting the significant role of psychological science in achieving the twin goal of (a) understanding and reducing discrimination and (b) identifying and implementing pathways to beneficial diversity (APA, 2012).

As an integrated response to such curricular and pedagogical challenges, we suggest a more thorough conceptualization of effective conditions for meaningful teaching/learning that centrally relies on learners’ agency as its critical component, yet also acknowledges the necessity of conceptual tools that support agency for successful learning. This approach integrates and expands upon Vygotsky’s approach (1978) with its emphasis on cultural mediation as central to teaching/learning; Freire’s critical pedagogy (1970) with its emphasis on critical consciousness; and sociocultural theories such as Bakhtin’s dialogism and participatory learning (Lave & Wenger, 1991) in a composite framework termed the Transformative Activist Stance (TAS, see Stetsenko, 2008, 2010, 2014, 2016, in press-a, b; and for applications, see Stetsenko & Vianna, 2009; Vianna, 2009; Vianna & Stetsenko, 2006, 2011; Vianna, Hougaard & Stetsenko, 2014).

According to TAS, teaching and learning become meaningful if these processes are integrated with students’ evolving identities as activist agents in their learning, lives, and wider community practices. We illustrate TAS-based critical-theoretical pedagogy as a model to arrange necessary conditions for agentive learning and meaningful knowledge construction by learners in a community college. One of the central components of this pedagogical model is the notion that knowledge is a process that is embedded in sociocultural practices and their histories, accessible through interrogation and active exploration by learners, and critically reliant upon learners’ own stances and future-oriented pursuits (Stetsenko, 2010, 2016).

Our approach is particularly germane to engaging and empowering students from marginalized and underprivileged backgrounds by providing them with analytical tools that promote critical engagement with knowledge to interrogate its competing and often clashing ethical-political underpinnings and implications and thus spur agentive positioning in learning. We provide an example of teaching the biological basis of behavior, or nature-nurture debate, in an introductory psychology course (for an additional example of how TAS can be applied, see Podlucka, this volume). The critical element consists of providing learners with the tools for exploring and contrasting reductionist (e.g., genetic determinism) versus dynamic and open-ended (e.g., epigenetic) theories of human nature including unearthing their sociopolitical underpinnings and implications such as promoting equity and diversity or, conversely, legitimizing inequality and social stratification. We also discuss how our approach provides a foundation for other topics such as human development, intelligence, and social psychology (i.e., prejudice) while infusing issues of diversity, power, privilege, and oppression throughout the curriculum. To conclude, we briefly mention our model’s broader implications for spurring students’ agentive positioning and activism.

## Teaching-and-Learning from a Transformative Activist Stance (TAS) Perspective

To present a brief synopsis, the central notion in TAS (which is a broad philosophical-theoretical framework that posits transformative worldview and onto-epistemology; for a summative expose, see Stetsenko, 2016) is that people contribute to and thus change their world and its community practices – while the world is reciprocally changing them through the cycles of recursive interactions – in the process of struggling for a sought-after future that people themselves (both individually and communally) envision, imagine, and commit to. In opposition to passive adaptation, the active contributions to community practices are rendered central to development in all of its facets including knowledge building in the process of teaching and learning. In this dialectically recursive and dynamically co-constitutive process, development and learning are contingent on individuals taking a stance — imagining and enacting changes in their community practices, and simultaneously, their own lives, including their selves, minds, understandings, and identities. These transformative processes are situated in shared contexts of communal history, enacted by collective practices, and reliant on these practices’ resources, tools, spaces, and collaborative interactivities. Yet the active role of people themselves in realizing these processes while acting on their commitments and stances, to what they themselves deem important and worth struggling for, is placed at the center. Applying this approach to education suggests that teaching/learning is about activism—understood as the right and ability to know for oneself, make up one’s own mind, and be an *agentive actor* of community practices including knowledge building that *matters*, all while striving to make a difference in the world. Critical, therefore, is the ability to take a stand on what is going on in one’s community and the wider world, to contest the existing status quo, and to stake a claim to how things could be understood and changed to achieve a better world (Stetsenko, in press-a).

According to this position, teaching/learning and science education should not be about the transmission of knowledge and facts (a point articulated already by Dewey, e.g. 1922) and not even about participation in community practices (as in the sociocultural framework, e.g. Lave & Wenger, 1991). In a more radical vein, teaching/learning are about agentive, authorial, authentic and activist stances and *contributions* by each learner, and each teacher, to meaning-making and knowledge construction. Importantly, knowledge in this approach is understood, firstly, as immersed in social practices and reliant on their interactivities and tools, yet also contingent on each and every learner’s own quests that are uniquely positioned, authentically conceived, and authorially carried out. Thirdly, science is understood to be open-ended, indeterminate, forever un-finalized and contested, and therefore resisting any final definition or canonization (for details, see Stetsenko, in press-a). Teaching/learning is an important pathway to developing one’s identity, whereby each act of learning and understanding is transformative of one’s identity. Yet this is possible only when knowledge and facts are authored, that is, revealed by the learners in *relevance to themselves*, to their evolving stances and life projects. Therefore teaching/learning has to be about connecting to, engaging with, and even more critically, *spurring* agentive identities by providing the tools of agency for taking a stance on knowledge and associated social practices.

Any lesson about, for example, the nature-nurture debate is also a lesson about how knowledge is “made,” how it came about and how it has been and can be now enacted to play a role in community practices in view of present challenges and conflicts. It is also about each learner finding out and expanding on who she or he is and, importantly, could be (see Stetsenko, 2016). Classroom lessons are about science and knowledge as human endeavors infused with strivings and pursuits that are embodied and implicated in each and every fact and act of science, each and every bit of knowledge, and also, quite critically, in each and every act of learners’ own knowing and understanding. This is not about indoctrination or imposition of alien agendas on students. Instead, science education needs and can be, to use Barone’s (2006, p. 227) expression, about artfully coaxing learners “into collaborative interrogation of stale, tired, taken-for-granted facts” *while learners carry out the work to assert themselves in the actualization of their potential to know and to matter* (Stetsenko, in press-a). Therefore, teaching needs to afford and be about learning that opens up possibilities for forming and discovering active social positioning, voice, and stance, including critical appraisal of conflicts in current community practices and their histories, the forming of a vision for what needs to be changed, and a commitment to this vision. In such an approach, both teachers and students teach each other and learn from each other – as one process of *teaching/learning* (or *obuchenie*; see Vygotsky, 1978).

This pedagogical model seeks to bridge the gap between direct instruction entailing provision of cultural tools (such as theoretical concepts and generalizations) on one hand, and independent discovery entailing learners’ active reconstruction of these tools, on the other – in a systemic-theoretical approach that renders knowledge meaningful through revealing practices “hidden” behind it (Arievitch & Stetsenko, 2000). In adding emphasis on learners’ future-oriented agentive stances, a three-fold model (Stetsenko, 2010, 2016) highlights how teaching/learning needs to integrate knowledge while revealing it: (1) as stemming *out of social practice* – as its constituent tools; (2) *through social practice* – where students need to rediscover these tools through their own active pursuits and inquiries; and (3) *for social practice* – where knowledge and “facts” are rendered meaningful in light of their relevance to activities, imaginations, and projects significant to students, that is, to activities engendered by and engendering their identities.

## Practical Illustration in Community College Teaching

We present now the outline for a unit on biological foundations drawing on both authors’ teaching experiences, especially the first author’s teaching in the introductory psychology course at a community college as this provides the most dramatic illustration.

To teach this topic in a student-centered manner is challenging because it requires knowledge of biology that community college students often have not yet mastered. Moreover, it deals in abstractions about human nature, which can appear far removed from students’ lives and concerns. Our strategy to confront this difficulty is to avoid the typical techno-scientific emphasis of textbooks, which sever this topic’s connection to its meaning and relevance to political-ideological positions related to colonialism, racism, sexism, ableism, etc. In contrast, our lesson goal seeks to expose such connections by interrogating them from students’ histories, experiences, and positions. This is critically relevant for underprivileged minority students who continue to be subjected to marginalization and oppression, as these practices are grounded in and legitimized by biologically determinist views and their biased implications, for instance, in intelligence testing and biomedical approaches to mental health.

We recommend beginning this exploration by inviting students to interrogate common views about human nature and biases embedded in them (typically shaped by previous school learning and media), with topics such as human learning and intelligence, mental health, criminal behavior, race, and gender. Given the role that knowledge of neuroscience and genetics plays in such discussions, including their contested status, students welcome the opportunity to understand *what is at stake* in this debate so they can meaningfully weigh in. Before we proceed we present some basic guidelines for creating a community of inquiry conducive to exploring and interrogating complex knowledge and associated social practices including their ideological underpinnings and entailments in ways that spur learners’ own evolving stances, positions, and identities.

As such explorations tap into different, divergent, and often conflicting perspectives commonly held by students, it is imperative to consider how to structure the course and its impact on classroom interactions (Cannon, 1990). An initial step is to discuss with students the very nature of the learning process, which entails transforming the learner (Lave & Wenger, 1991). We stress that such transformation is both intellectual and emotional; learning, if it is meaningful, likely challenges one’s beliefs, values and attitudes. Moreover, instructors must make clear to students that knowledge is ineluctably contested as claims are made from different, often competing positions and must therefore be interpreted in different ways, with different implications. Thus, we believe an introductory course should prepare students to critically approach theories and claims by (a) identifying underlying assumptions, (b) emphasizing that this is how science develops, by contesting and debunking its own claims, without ever reaching the “final” answer and (c) with learning often challenging one’s assumptions and positions. This discussion prepares students to accept that difficult debates and emotions are inherent to the learning process. It is also crucial to tell students that they are expected to work together – just as scientists typically do, too – and, given our diverse backgrounds, that we will need to create an environment for learning across difference. Group-dynamics activities help students become familiar with one another and their diverse communication styles and can be geared to exploring students’ varied personal experiences calibrated to increase their comfort in talking and participating in class (See appendix B for examples of games and activities that help students get to know and feel comfortable with the class).

As this lesson touches on both race/racism and evolution, topics that often become deeply personal and sometimes explosively emotional, we recommend the literature on difficult dialogues in the classroom (APA, 2012; Sue, 2015; Sue et. al., 2009; Tatum, 1992; Young, 2003). For lack of space, we only briefly highlight the following basic guidelines. First, instructors must recognize themselves as racial/cultural beings to anticipate how their own identity might impact classroom dynamics. Second, they must take stock of the structure of the classroom (e.g., class size, physical layout, seating arrangement) and whom they teach (i.e., the class distribution across gender, race, religions, ethnicity, age, national origin, physical ability, etc.). This should include attention to the dynamics of intersectionality, as people belong to multiple axes of identity (e.g., gender, race, ethnicity, class, religion, and disability) that intersect in significant ways (APA, 2012). At community colleges, classes consist overwhelmingly of low-income students of color and immigrants with incredibly diverse cultural and religious backgrounds. Because the first author is a first-generation, Latino immigrant our examples reflect his experience as a faculty member of color teaching extremely diverse classes where White students are the exception (White instructors will find thorough guidelines for teaching students of color as the literature on racial dialogues focuses on the challenges of Whites talking with/teaching people of color; e.g., Sue, 2015). Third, instructors must try and create a climate of inquiry in the classroom where emotions are attended to, validated, and discussed (Sue, 2015; Young, 2003). Given that discomfort and confusion are common when diversity/multicultural issues arise (e.g., anger, guilt, defensiveness, helplessness, etc.), these feelings should not be avoided, denied or suppressed. Rather, instructors should be prepared to make sense of them, especially as they may not be acknowledged or understood by students (or teachers themselves). While it may seem easier to avoid potentially explosive conversations of race and racism, it is worth bearing in mind that discussion of virtually any social issue (e.g., inequality, sexism, gender, homophobia, religion), and even broader issues such as evolution, can trigger microaggressions in diverse classrooms (Sue, 2015). Studies from classroom settings indicate (a) the importance of allowing space for the strong expression of feelings, (b) the need to stress that it is okay to have them, (c) that talking about emotions helps students understand themselves and others better, and (d) that it is important to create conditions that allow for openness and receptivity to strong emotions (Sue, 2015). Instructors should avoid getting sucked into argumentative or polarized debates and instead direct students to examine their own reactions and feelings. This focus on emotions allows instructors to control the process, not the content of a discussion or debate.

To set the stage for exploring and interrogating claims related to the nature-nurture debate, the first author accesses, in the first week of class, students’ initial positions on the debate by asking them to share why they are interested in psychology. A memorable answer came from a student who wanted to know why some people “*are born* serial killers.” Many students express interest in mental disorders, which most attribute to a “chemical imbalance” in the brain though they also commonly attribute them to environmental factors. It is enough for an instructor to ask the class which factor (biological or environmental) is more important in determining psychological characteristics and behavioral traits for students to articulate three possible alternatives, namely, that nature is primary, that environment is primary, and that both sets of factors influence trait development, though they cannot say how such interaction takes place. Students’ views are often driven by personal experiences with mental health services, as many of them or their family members have been diagnosed with mental disorders. Whether such disorders are, primarily, biologically or psychosocially based is something that personally matters to students and evokes their interest and concern. Moreover, many students apply notions of fixed ability to their own learning, which typically limits their career aspirations (see Whiteman & Ochakovskaya, this volume).

The first author then begins the actual unit on nature-nurture by inviting students to address the “logic” behind commonly held views in their most general, theoretical regularities, in this case reductionism and determinism (Lewontin, Rose, & Kamin, 1994). One clear and accessible example comes from a passage of the book “The Brain that Changes Itself” (Doidge, 2007) about brain plasticity in which neuroscientist Michael Merzenich reminisces about an episode from childhood when his relative was awarded national teacher of the year. After the ceremony in the White House this relative visited his family and was asked about her most important teaching principles. The relative answered, “Well, you test them when they come into school, and you figure out whether they are worthwhile. And if they are worthwhile, you really pay attention to them and you don’t waste time on the ones that aren’t” (p. 68). Students are asked to jot down their thoughts about that teacher’s comment including how they feel about it. Invariably students express shock, disappointment and even anger, though many say that they are not surprised. Then they are asked to identify what assumption about human nature and development underlies the teacher’s idea. Students easily make connection to the idea that human traits are biologically based, i.e. that intelligence and the ability to learn is not the same for all, that some people have more potential to learn than others. Then the class reads Merzenich’s own comments on his relative’s assumption, that “it’s just so destructive to imagine that our neurological resources are permanent and enduring and cannot be substantially improved and altered” (p. 6).

Then we discuss the implications of two opposite assumptions, namely, whether the development of psychological functions is biologically predetermined and fixed versus flexible and open to change. When asked to apply that to differential academic achievement, students can easily discern two opposite assumptions. One posits that the problem stems from children’s intrinsic characteristics (e.g., neurological or genetic), whereas the other posits that the problem stems from the environment (e.g., inadequate schooling, lack of support). Then the notion of reductionism is introduced as a mode of explanation that attributes the properties of complex wholes (from proteins to societies) to the properties of their units (whether molecules or human communities). The corollary conceptualization, biological determinism, can then be explored as a way of thinking that explains human lives and actions as “inevitable consequences of the biochemical properties of an individual’s cells; and these characteristics are in turn uniquely determined by the constituents of the genes possessed by each individual” (Lewontin, Rose, & Kamin, 1994, p. 6).

In a more technical vein, supporting students reading and writing is a persistent challenge especially in community colleges. Possible strategies to address this include reading key passages of sophisticated academic texts together with students in class. Another strategy is to ask students to break down complex sentences (e.g., clarifying causal links in subordinate clauses) and express their content in their own words.

Next, we invite learners to explore the history of these notions through works by Fancher (2004) on the legacy of Francis Galton. This is important because Galton was the founder of a tradition connecting the concepts of nature and nurture with the topics of heredity, intelligence testing, and eugenics. The term “eugenics” was introduced by Galton to describe a program of selective breeding, which, in his view, was “supported” by “experiments” on testing for a racial hierarchy of human capacities (Winston, 2004). Interested in “improving human stock,” Galton studied the families of those he thought were outstanding men of his day and concluded that mental powers “run in families.” Moreover, Galton sought to demonstrate that Africans were of “lower intelligence” than European Whites and he even hoped that “inferior” races would gradually become extinct. This opens the way to explore how eugenics thrived on the fears fueled by racist associations, dramatically influencing discriminatory policies in education, immigration, and mental health. Making eugenics’ appalling legacy accessible to students is an avenue to discern the kind of practices that gave rise to the key nature-nurture debates. Such an exploration makes it possible for students to discover the meaning and relevance of these debates and related knowledge claims vis-à-vis the context of imperialist and racist practices. This implies seeing “how five centuries of studying, classifying, and ordering humanity within an imperial context gave rise to peculiar and powerful ideas of race, culture and nation [and nature-nurture] that were, in effect, conceptual instruments the West used both to divide up and educate the world” (Willinsky, 1988, p. 4). Students then explore whether and how these practices continue today by including readings on the recent rise of eugenics, essentialist biases, and biological reductionism. Useful materials include, for example, an article by Allen (2001) discussing how the recent developments in research on biological bases of human development bear similarity to what was happening in the 1920s and against the same background of deep economic crises, bitter anti-immigration sentiment, and social upheaval. Instructors can draw on other scholars echoing this assessment in exposing the rise of eugenics across history, again in evidence today, reflecting the power of persistent essentialist biases in sciences and societies (Dar-Nimrod & Heine, 2011).

Students are also invited to explore the implications of these assumptions (i.e., what they imply about human potential) vis-à-vis current social issues, such as inequities across groups (e.g., race and gender). The first author does that by having students read the report “The State of America’s Children” (Children’s Defense Fund, 2014) and describe some noteworthy findings and how they feel about them. Consistently, students report surprise and puzzlement with the extent of child poverty as well as disparities in a range of social indicators across racial/ethnic lines. When asked about interpreting those findings according to biologically reductionist/determinist notions, students clearly recognize how problematic such views are, in that they help deflect social problems that require social change (e.g., in economic, educational, health, and related social policies) by turning them into biological problems, thus serving to blame the victims of societal inequality. Then students are asked to question whether outrageously racist scientific notions, as in eugenics, have been truly eradicated, a question many students do raise once the ground is paved for that.

The upshot of this exploration at the broad level of assumptions, before specific concepts and research findings are introduced, is that it lays the ground for students to discover and form their own active social positioning. This also begins to change their relation to learning in that they see it as involving articulating one’s own voice and stance in order to make sense of conflicting views and positions. This is an important step to connect learning and identity as students begin to consider that their views might change, that learning might actually transform them, not merely provide them with information.

Once the relevance of these explorations to students’ own lives and experiences is recognized, the ensuing step is to connect the debate about broad assumptions on human nature with a more specific psychological discussion. Thus, the first author asks students to indicate what they think the sources of human traits are. He begins by revisiting the issue of the origins of human traits by asking students to list several human traits (the instructor might provide examples, such as height, weight, eye color, intelligence, etc.) as the word trait can seem too vague to students. Then he asks students to indicate the origins of such traits. Invariably, they identify three types of traits, genetically determined, environmentally determined, and traits that result from the interaction of genes ‘and’ environment. In fact, most students take the view that biological and environmental factors interact, what Oyama (2000) calls conventional dualism. Students’ interactionist views typically match the bio-psycho-social approach most textbooks use, according to which environmental influences interact with our genetic predispositions (Myers & Dewall, 2015). The next step involves an examination of how a textbook presents this material. Even though the first author does not assign a textbook, drawing instead on multiple sources for content knowledge, for this part of the lesson he assigns the chapter on nature-nurture from Myers & Dewall’s (2015) textbook for general psychology. From this point onward, the class covers various concepts and research findings from different perspectives.

Though the textbook presents findings indicating that experience influences genetics and modifies the brain’s pathways (i.e., neuroplasticity), behavioral genetics and evolutionary psychology figure in prominently. The focus is now on these approaches’ underlying assumptions. In the passages assigned, students read that we are “mobile gene machines” whose natural desires represent our genes’ way of reproducing themselves, so that we are living fossils —“collections of mechanisms produced by prior selection pressures” (Myers & Dewall, 2015, p. 148). Problematically, this translates into so called gender differences, which posit, for example, that men are more sexually motivated than women. This is purportedly because “[w]omen have more at stake (…) Women are limited in how many children they can have between puberty and menopause” (p. 146). This gender bias rarely goes unnoticed and most likely the women in the class will call it out for what it is – an outrageously outdated and unacceptable bias. This is another step toward agentive positioning as students see that meaningful learning cannot escape examining its ethical-political context and articulating one’s own stance. This can be strengthened by classroom discussions focusing on gender roles and their stereotypes, questioning who benefits from their perpetuation and an interrogation of their conceptual and empirical bases.

The class now turns to a close inspection of interactionism on both logical and empirical grounds. One common conceptual problem, rarely addressed in introductory courses, which afflicts the scientist and layperson alike, is the lack of understanding that population-genetic analyses deal only with factors that explain variation in traits rather than development of traits themselves. As Gottlieb (1992) reminds us, this has to do with “an indubitable legacy of Galton’s thinking that the outcome of individual development is determined so much by nature and so much by nurture” (p. 118). Students are then very surprised to discover that a trait, such as one’s intelligence or personality, cannot be said to result “this much percent” from genes and “that much percent” from one’s experiences. This fallacy is easily debunked when students are presented with examples of how genetic and environmental influences cannot be partitioned but are integrated in developmental processes, such as alternative splicing and “immediate early genes” (see below for a description of each concept and how it can be used).

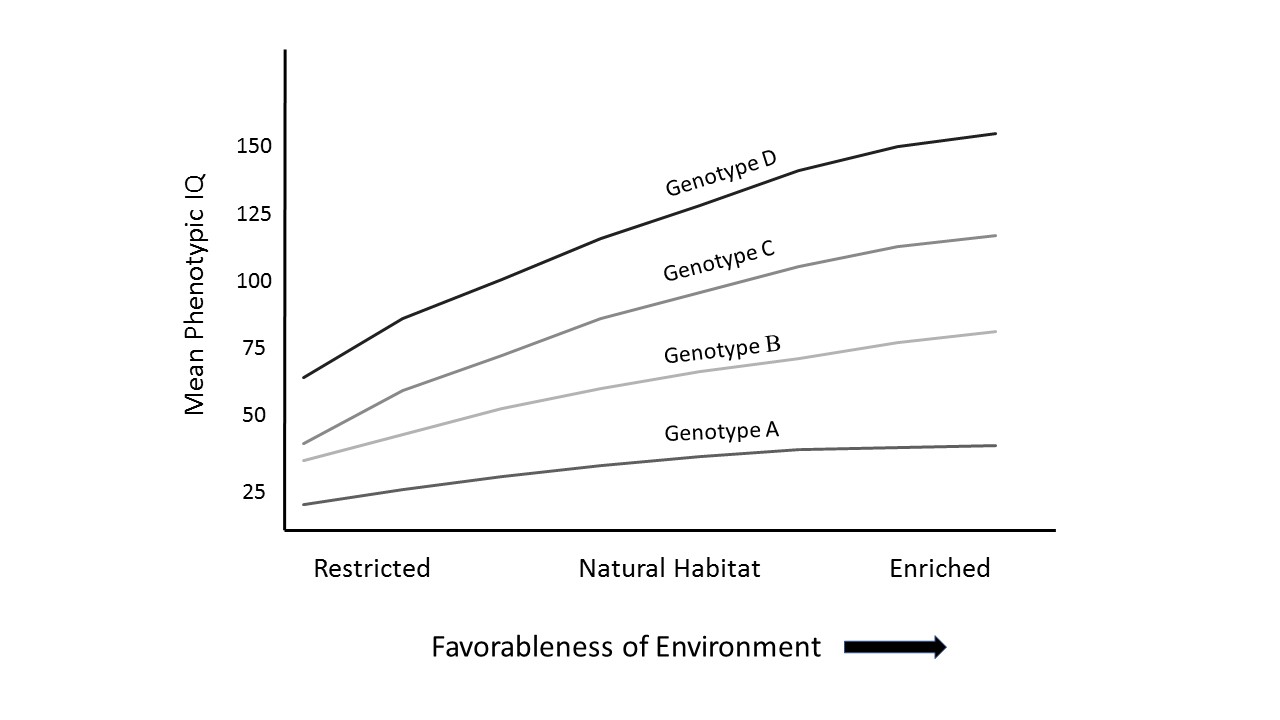
The following step to debunk this assumption consists of exploring, together with students, the critique of determinist and reductionist theories from dynamic and developmental systems perspectives (Gottlieb, 1992, 2007; Oyama, Griffiths & Gray, 2001). The focus is on conventional interactionism and its reductionist and determinist biases. This highly theoretical discussion can be made concrete to students with a compelling example Lewontin (2001) provides to deconstruct the old-fashioned (ironically, still popular in textbooks), erroneous formulation that “genes determine an organism’s capacity, a limit that may or may not be reached depending on how adequate the environment is” (p. 26). Lewontin calls this the ‘empty bucket’ capacity metaphor. The idea is quite simple:

Genes determine the size of the bucket, and environment how much is poured into it. If the environment is poor, then none of the buckets will have much in it at all and all genotypes will do poorly, but if the environment is favorable, then the large buckets will contain a great deal, while the smaller ones will be filled to their capacity and overflow (ibid, p. 27).

Lewontin explains how this notion has been widely invoked in the literature on IQ, such as notoriously expressed by Jensen in 1969 (cited in Lewontin, 2001): “The claim is that human IQ will indeed vary over environments” (p. 27). In his classes, the first author introduces Jensen’s hypothetical graph, which plots ‘mean phenotypic IQ’ against ‘favorableness of environment.’ The graph (see Figure 1) shows four lines representing different genotypes arranged one on top of the other, so that the bottom one (genotype A) barely shows gains in an enriched environment, whereas gains are clear in the top one (genotype D). Students explore whether this graph demonstrates that genes influence IQ and whether it demonstrates that the environment does so too. Most students easily answer “yes” to both questions and the class, following a discussion, concludes that this is indeed an interactional explanation for the source of variation in human intelligence. Then the important question is explored, “Based on this graph, can all genotypes equally benefit from good quality environments? Why or why not?” Students quickly answer “no” and point out that the example indicates that one’s capacity for intelligence is genetically fixed, depending on whether one “has a small or big bucket”, as they humorously take up the metaphor.

After students recognize the persistence of genetic determinism in interactional conceptions, the next step consists in together exploring research findings demonstrating the context-dependent functioning of genes. This requires that students learn what genes are and how they function (there are many videos and animations on the internet representing gene transcription into m-RNA and protein synthesis, which allows for ‘flipping the classroom’ by assigning students to view them outside class, see Arner, Aldosari & Morris, this volume). Learning about such explicitly biological content, which students otherwise resist as “too much biology in a psychology course”, now becomes a condition of making sense of and weighing in on the nature-nurture debate. Such negotiations are fundamental to co-construct with students the meaning and relevance of scientific/academic knowledge. This is how the first author coaxes students to dig deeper into findings from molecular biology that matter for this debate and serve as the empirical basis on which the determinate or indeterminate nature of the origins and development of traits can be adjudicated.

*Figure 1.* Phenotypic variation as a function of genotype and environment, adapted from Richard Lewontin’s *The Triple Helix* (2001).



Students are then prepared to learn about new features in molecular biology that radically challenge the idea that genes single-handedly predetermine protein synthesis and by extension trait development (See appendix for resources). The most illustrative, in our opinion, is alternative RNA splicing (Moss, 2001), the context-dependent “editing” of the m-RNA out of which different proteins are synthesized from the same gene. The important point is that though genes are indispensable resources in protein synthesis, they do not determine what protein will be produced, as this depends on environmental conditions of the cell (Neumann-Held, 2001).

In the first author’s experience, such biological detail makes a big difference in that it captures how genes and environment are inextricably linked, thus disclosing the indeterminate nature of protein synthesis and by extension, trait development. This example is so convincing to many students that they feel as though they can now “see with their own eyes” (as they put it) that genes do not control even the proteins made, let alone traits. It also persuades students, many of whom remain skeptical about the need for learning about this aspect of biology, that this type of knowledge actually matters to them personally.

Another compelling demonstration that genes and environment cannot be partitioned as alternative sources of influence or causal power in development is the activation of immediate early genes a few minutes following sensory stimulation, which controls the production of proteins involved in building nerve circuits and reshaping existing ones (Johnston, 2008). On this basis, the fallacy of conventional interactionism, which portrays the interaction between genetic and environmental influences as an additive one, incorrectly implying that “more of one kind of influence inevitably means less of the other” (Johnston, 2008, p. 18), can now be interrogated by students themselves. Moving now from specific details back to broad conceptualizations, students are invited to consider the bio-psycho-social model, ubiquitously present in the opening chapters of textbooks as the overarching framework for understanding nature-nurture interactions. Students can then quickly identify its implicit additive character and thus its determinist and reductionist bias and associated ethical-political implications.

One remarkable outcome of this lesson is that many students apply this knowledge to their own learning and potential. Having worked through the intricacies of this topic, which requires dealing with complex materials commonly deemed above the community college level and often resisted by instructors, students discover that this experience takes them beyond their initial learning level, not just cognitively but in their attitude and motivation to learn. They often jocularly express this to the first author saying that now they have a ‘bigger bucket’, referring to Lewontin’s IQ metaphor. While this may not be the most elegant metaphor, it certainly captures and expands upon the dialectics of learning and development proposed by Vygotsky (1978) in the Zone of Proximal Development.

## Conclusions

In the TAS-based approach, teaching/learning needs to afford the space and provide the tools for students to discover their own active social positioning, voice, and stance including critical appraisal of knowledge claims vis-à-vis their lives and current community practices. In order to teach in a truly student-centered way, a critical step is to provide the tools of agency so that students discover the meaning of knowledge claims for themselves while taking a position on these claims, rather than taking knowledge for granted.

In this context, highly complex knowledge about genetics and the nature-nurture controversy and the seemingly “abstract” onto-epistemological underpinnings of knowledge construction, such as reductionism and determinism, can be made meaningful to students as they discover these for themselves and contribute to discerning their history, practical relevance, and ethical-political underpinnings and implications. Importantly, this nature-nurture unit builds foundations for other topics, including learning about mental health, intelligence, and diversity, as it provides the tools to interrogate history, assumptions, and implications of knowledge claims. Moreover, this lesson addresses issues that are personally relevant especially to minority community college students, such as racism, sexism, and disability, allowing for the infusion of diversity across the curriculum, rather than marginalizing these as merely added-on, separate topics. Learning such topics via activist positioning creates space for students to consider and examine their own views, stances, and life agendas, thus making learning truly meaningful and agentive.

Our strategy to introduce complex scientific knowledge and explicitly address its contested character and ideological ramifications runs counter to common instructional strategies. These strategies typically conceptually simplify the curriculum in order to make it “accessible” to community college students who are often approached from deficit-based views. Instead, our critical-theoretical approach to student engagement is based on providing the tools for making complex theoretical concepts personally relevant to students by connecting them to social issues and their histories, students’ own lives and community practices in which they have a stake including as they embark on their future life agendas and careers. Thus, we approach student-centered pedagogy in the ethos of "infinite potential" of all students (see Stetsenko, in press-b) who, provided they have access to quality tools such as critical-theoretical concepts, can be empowered through college education as agents of their own learning, lives, and wider communities. In this approach, learning and students’ identities become connected as learning provides tools for students to take a stand, first toward commonly held views, then toward the material learned, and by extension, to disciplinary and general knowledge.

The final step in this transformative cycle can take place when students expand their activist stance to their emerging life agendas and community practices. Though this cannot be fully achieved during a single course, contexts can be designed to spur such transformation as the cumulative result of approaching all topics in the curriculum in a critical-theoretical way. Additional spaces, such as co-curricular activities (e.g., undergraduate research, clubs, campus events, workshops, seminars, etc.), can play a vital role in allowing students to continue exploring and co-constructing the tools for their quests for meaningful contribution to community practices and society at large. Both authors have collaborated on such a co-curricular program in the community college termed the Peer Activist Learning Community where students collaboratively investigate and develop their transformative activist stances through the tools of learning, by expanding their contributions to a range of community practices and social issues (for details, see Vianna, Hougaard & Stetsenko, 2014). As a result, many students became more agentive in their communities and their own learning, such as establishing conferences at the community college for students and faculty, seeking and obtaining scholarships and awards, presenting their work at professional conferences, and moving on to graduate school. They have also become involved in activist endeavors in their communities, including joining in the struggle against tuition hikes in the university. Developing into activist agents is a complex process that only students themselves can embark on, yet we hope our chapter illustrates how providing the tools of agency for this process can be made central to the psychology curriculum.

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**Appendix A**

Additional Resources on Role of Genes in Development:

**Readings:**

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• Lickliter, R. (2008). Developmental Dynamics: The new view from the life sciences. In A. Fogel, B. J. King and S. G. Shanker (Eds.), Human Development in the Twenty-First Century: Visionary ideas from systems scientists. New York, NY: Cambridge University Press.

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Videos:

* The Brain that Changes Itself:

<https://www.youtube.com/watch?v=bFCOm1P_cQQ>

* Secrets of Brain: <https://www.youtube.com/watch?v=w6AfzCNDmbY>
* The Secret Life of the Brain- Episode 1: The Baby’s Brain: https://www.youtube.com/watch?v=h3BoUpMjY-YThe Secret Life of the Brain- Episode 1: The Baby’s Brain: <https://www.youtube.com/watch?v=h3BoUpMjY-Y>

**Appendix B**

**Resources for Group Dynamics Exercises and Games**

* Boal, A. (2002). Games for actors and non-actors. New York: Routledge.
* Rohd, M. (1998). *Theatre for community, conflict & dialogue: The hope is vital training manual*. Portsmouth, NH: Heinemann.

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