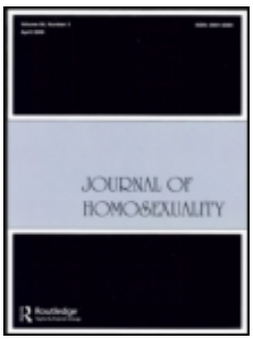

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Anne Fausto-Sterling PhD

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The Dynamic Development of Gender Variability

ANNE FAUSTO-STERLING, PhD
Department of Molecular Biology, Cell Biology and Biochemistry, Brown University, Providence, Rhode Island, USA

We diagram and discuss theories of gender identity development espoused by the clinical groups represented in this special issue. We contend that theories of origin relate importantly to clinical practice, and argue that the existing clinical theories are underdeveloped. Therefore, we develop a dynamic systems framework for gender identity development. Specifically, we suggest that critical aspects of presymbolic gender embodiment occur during infancy as part of the synchronous interplay of caregiver-infant dyads. By 18 months, a transition to symbolic representation and the beginning of an internalization of a sense of gender can be detected and consolidation is quite evident by 3 years of age. We conclude by suggesting empirical studies that could expand and test this framework. With the belief that better, more explicit developmental theory can improve clinical practice, we urge that clinicians take a dynamic developmental view of gender identity formation into account.

KEYWORDS dynamic systems, gender, gender identity, gender identity disorder, gender identity disorder of childhood, gender identity disorder of adolescence, gender variance, transgender, transsexual, treatment

Parents of gender variant children face a multitude of questions and dilemmas. Should they discourage the gender variance? Should they "go with the flow"? How can they protect their children from harm—both physical and mental? How can they deal with their own feelings about their

Address correspondence to Anne Fausto-Sterling, Nancy Duke Lewis Professor of Biology and Gender Studies, Brown University, Box G, Providence, RI 02912, USA. E-mail: Anne_fausto-sterling@brown.edu

gender variant child? Is the gender variance treatable? Is it their fault? What will become of their child as he or she grows to adulthood? The clinicians invited to address these and other questions for this special issue of the *Journal of Homosexuality* bring decades of boots on the ground clinical experience to the discussion. Indeed, we have come a long way both in terms of knowledge and of attitudes since the 1960s when Robert Stoller first analyzed children struggling with gender identity issues (Green, 2010; Kessler & McKenna, 1978; Stoller, 1968).

We congratulate the clinicians writing for this issue for their persistent, thoughtful, and pioneering work. Since I am a biologist and gender theorist, not a clinician, I do not intend in this commentary to reach conclusions about clinical practice. Rather, I have used several of the texts as a jumping off point to examine what we might and might not know about the origins of gender variance, and further, to offer some thoughts on how we might frame or model gender development in childhood.

Two housekeeping points: First, I am restricting my discussion to early presenting (within the first five years of life) gender identity issues. I do so because my own theoretical inclination is to think developmentally about the first emergence of difference and because children are the explicit topic of the focus articles. Second, because language choice betokens a theory of origin, people dispute the very language used to describe these children. The terms *gender identity disorder, gender dysphoria, gender variant children and gender nonconforming* each suggest different behaviors that may or may not warrant clinical treatment. Indeed, if one views these terms as representing conditions along a continuous spectrum of gender identity and expression, then the question becomes: is there a normative line along this spectrum and where should it be drawn? The word "gender" in the context of this article, is the culturally local behavioral expressions of an internalized individual identity that includes understandings of masculine and feminine. In this sense, gender is not universal, but is tailored to the specific culture in which a child develops.

EXTRACTING THEORIES OF DEVELOPMENT

The clinicians represented in this issue operate from different theoretical and practical points of view. To simplify the discussion I have assigned them to one of two kinship groups. The first joins Zucker, Wood, Singh, and Bradley (this issue) and de Vries and Cohen-Kettenis (this issue) as theoretical "kissing cousins"; the second links Ehrensaft (this issue) and Menvielle (this issue) between whom—in my opinion—run common theoretical threads. Finally, I found it difficult to extract any theory from Edwards-Leeper and Spack (this issue), although their point of view may be made clear elsewhere. The Zucker et al. kin group uses multipronged analyses, accepts pathology

as part of the mix, and has published extensive numerical and qualitative details of the children visiting their clinics, including prospective follow-up studies. At the same time that they consider the possibility of multiple factors contributing to childhood gender identity variance, they seem unwilling and—due to what they view as a lack of data—unable to draw causal conclusions. Therefore, I call this kin group the "agnostics." They assume a practical, one case at a time approach to treatment.

I call the group represented by Menvielle and Ehrensaft "naturalists." Ehrensaft's (this issue) notion of a true gender self that shows up to the parents "rather than being shaped by them, suggesting an innate component to gender nonconformity" (p. 340) is softened by the idea that subsequent to showing up, the true self gets woven into a nonbinary gender web. The naturalists believe that most gender nonconformist children are mentally healthy and come from healthy families; they argue that the stress and anxiety felt by gender variant kids results from external pressures, sometimes including the inability of parents to cope with these curious children who have shown up on their doorsteps. For the naturalists, therapeutic goals include helping children to accept their true selves as they learn how to negotiate gender in a complicated and often hostile world (Ehrensaft, 2011). In addition to individual psychotherapy, an important innovation has been the development of social networks for gender variant families, providing a safe social space with others of like mind and constitution (E. Menvielle & Tuerk, 2002; E. J. Menvielle, Tuerk, & Perrin, 2005).

Finally, the agnostics and the naturalists agree on certain things. They both see biology as a scaffolding on which the psyche is built. They both agree that there are probably several kinds of gender variance. And they concur that at least on occasion, psychopathology and gender variance coexist, possibly reinforcing one another.

The Agnostics

Figure 1 stylizes the apparent elements of the agnostics' model. They propose that predisposing biological factors (e.g. genes, hormones, temperament, brain structure) provide a structural scaffolding that may precipitate other events or perpetuate other responses. In Figure 1, predisposing biology appears as a background, but no arrows link biology to the other factors; nor do the other theoretical elements feed back to biology. This essential point is missed by both Zucker et al. (this issue) and de Vries and Cohen-Kettenis (this issue). Brain development itself, especially in children, is to a large extent directed by social and sensory experiences; so too is hormone biology and physiological regulation (Field, Diego, & Hernandez-Reif, 2006; Petanjek, Judaš, Kostović, & Uylings, 2008; Schore, 2005). A well-developed theory of gender identity needs to place this dynamic at its center.

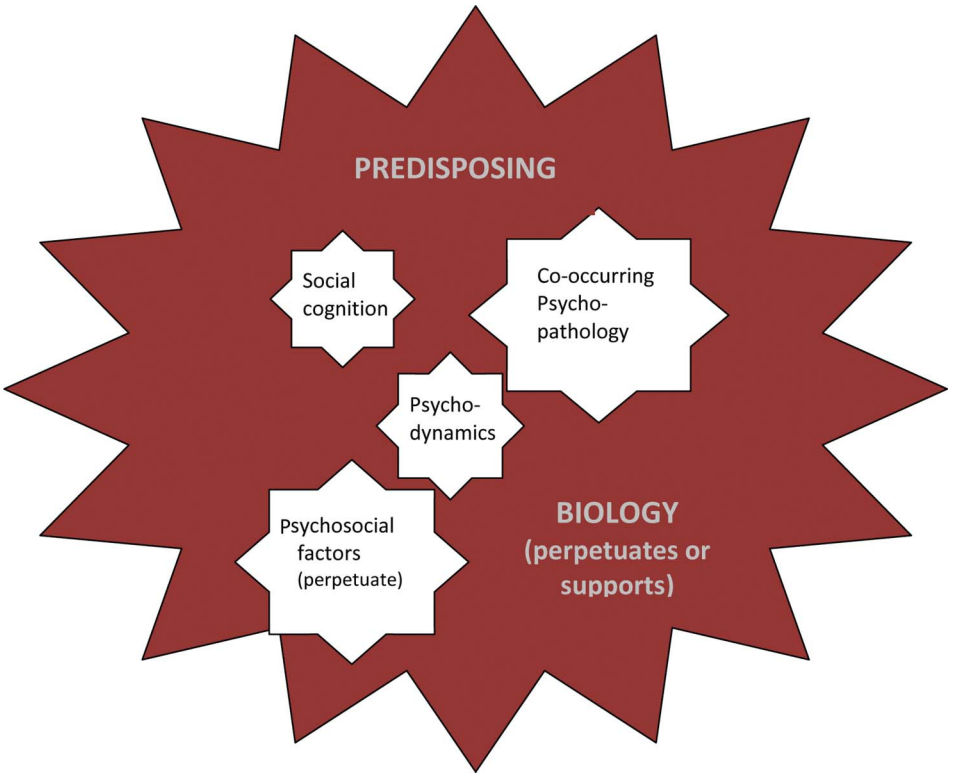

FIGURE 1 The agnostic's model of gender identity formation (based on Zucker, Wood, Singh, & Bradley, this issue) (color figure available online).

The biopsychosocial model conceptualizes psychosocial factors as conscious parental responses to their child's cross-gender interests. Zucker et al. (this issue) view parental neutrality or encouragement of cross-gender behavior "as a perpetuating factor" (p. 377). As used by the agnostic group, social cognition seems to involve how a child applies his or her own reading of gender in his or her social world to his or her sense of self. The agnostics provide strong evidence of co-occurring psychopathology for many, but not all of the gender variant kids they see in their practice. For example, S. Coates (1992; Coates & Wolfe, 1995) has focused over the years on severe separation anxiety as a precursor to GID in some boys; more recently, the Dutch group has proposed an elevated co-occurrence of autistic-like rigidity and obsessiveness in gender dysphoric kids (de Vries, Noens, Cohen-Kettenis, van Berckelaer-Onnes, & Doreleijers, 2010). The naturalists, it should be pointed out, also report such co-occurrences, but consider them to be rare and unrelated to mainstream (if I may call it that) gender variance. Some clinicians treat the anxiety or obsessiveness and find that the cross-gender obsessions abate. It seems likely that the succession

of childhood obsessions is one of the underlying systems to be explored as we try to understand gender identity development (DeLoache, Simcock, & Macari, 2007).

Last, the biopsychosocial model proposes psychodynamic mechanisms. These mechanisms may involve the child's assumption of unresolved family conflict and traumas. In family systems lingo, the child manifests the symptoms of a distressed family system; cross-gender interests are the symptoms of a poorly functioning family, and treatment needs must be a family affair. Importantly, different children may have different response thresholds for similar traumatic incidents, possibly explaining why what appears to be similar family stresses could, in one case, result in a gender-focused coping response but not in another.

The biopsychosocial model contains important elements for understanding gender development. The agnostics supply evidence from case studies to support their contention that each of these systems has the potential to play a role in the development of cross-gender identities and behaviors. Yet, they are curiously unlinked and static. It would seem the same elements ought to be a component of gender development in all kids.

The Naturalists

In truth, the naturalists don't offer a theory of gender identity origins. Instead, they posit a preformed, but unexplained true gender self and focus on how the true self develops and takes individual shape within a particular nexus of culture, nature and nurture. None of these latter terms are precisely defined, but the naturalists develop an important point: gender identity is not binary. They conceptualize it as a three dimensional web, although neglecting that important fourth or developmental dimension. The strength in this approach is the emphasis on individual difference. The weakness is the loss of insight into how previous form shapes subsequent structure (Thelen, 2000).

Using the following passage from Ehrensaft (this issue) I have created an image of the naturalist's theory of gender identity (Figure 2A).

> The true gender self begins as the kernel of gender identity that is there from birth, residing within us in a complex of chromosomes, gonads, hormones, hormone receptors, genitalia, secondary sex characteristics, but most importantly in our brain and mind. (p. 341)

After birth, each true gender self is "channeled through (individual) experience with the external world . . . but its center always remains . . . driven from within . . ." (p. 341). This postnatal shaping is depicted in Figure 2B.

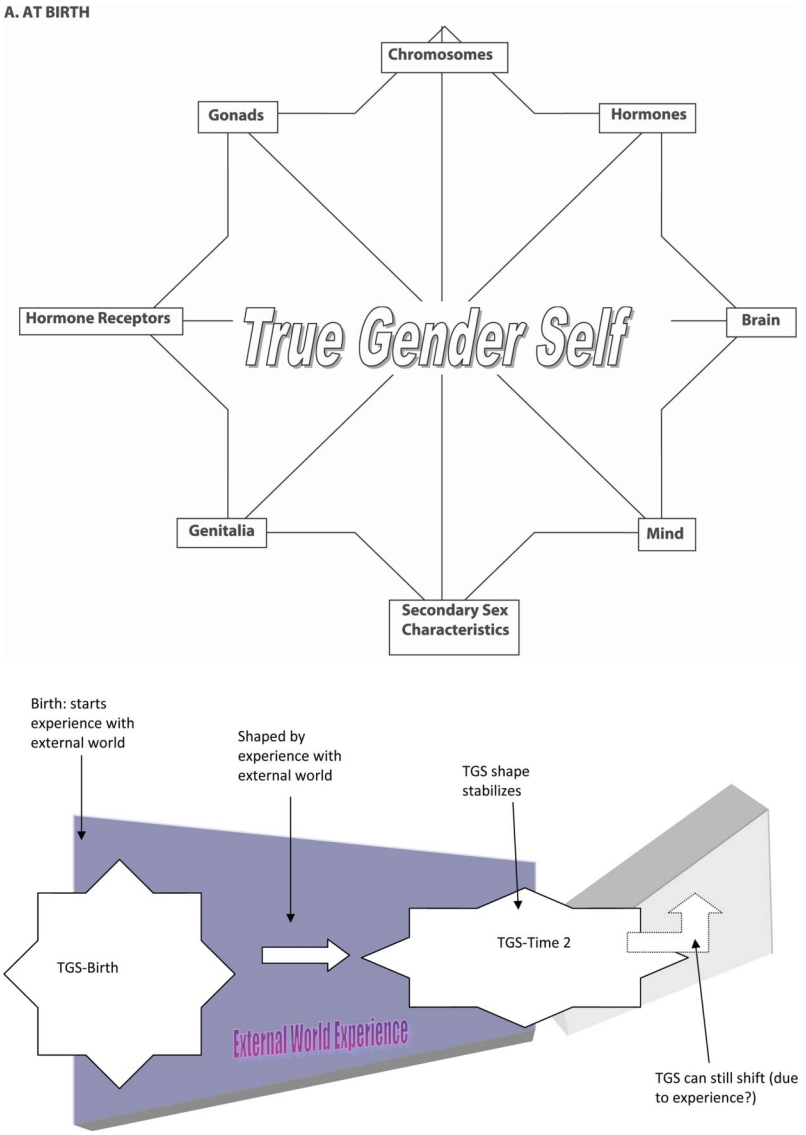

FIGURE 2 The naturalist's model of gender identity formation (Based on Ehrensaft, this issue) (color figure available online).

Two noteworthy characteristics emerge from both the agnostics' and the naturalists' theories. First, the working parts seem peculiarly unconnected. Second, gender identity is strangely disembodied and outside of the world. How do the precursors of gender identity manifest themselves through the body—a pleasure in the soft or the pink, an aversion to rough play, for example? I argue that such signs of gender are in the body, yet, these clinical theories seem to work only from the mind. Following the extraordinary lead

provided by Thelen and colleagues (2000), and by psychoanalysts such as Harris (2005) and Corbett (2009), I argue that gender development be placed in a dynamic embodied systems framework. First, I provide some general principles, then, I explore the presymbolic origins and early symbolic manifestations of gender identity. (Presymbolic representations are prelinguistic, physiologically embodied memories.) I end by suggesting that the transition from presymbolic to internalized symbolic representations of gender lies at the heart of the matter.

A DYNAMIC SYSTEMS FRAMEWORK FOR GENDER IDENTITY DEVELOPMENT

General Considerations

Thelen (2000), and biologists such as Chiel and Beer (1997), insist that behaviors and cognition arise from the coupling of several contributing systems. Cognition, for example, depends on particular kinds of experiences had by particular bodies with particular perceptual and motor abilities. These sensory and motor capacities link to form a matrix within which reason, emotion, memory, language, and more reside. The developmental issue is to understand the timing, strength, and history of the coupling between these critical systems.

The world is the matrix in which all elements embed. This contrasts with predisposing factors that provide the underlying matrix (Figure 1). By "the world," I intend all the experiences encountered by a child from before birth and throughout life. Postnatally, these include caregiving, touching, dressing, feeding—that is, all of the emotional and physical interactions a newborn and developing infant encounters in his or her immediate world (see, e.g., Fausto-Sterling, 2010a, 2010b, 2011). The world has other people in it and the infant cannot develop without them. But also, the infant's behaviors influence and shape how others respond. At birth an infant's behaviors relate importantly to the state of development of his or her nervous and digestive systems and physiological capacities to self-regulate. Beyond, but also reaching into the nursery, the world brings specific gender attachments—flowery wallpaper, toy trucks, pink onesies, gendered parental assumptions and expectations, and more (J. F. Feldman, Brody, & Miller, 1980; Rheingold & Cook, 1975; Shakin, Shakin, & Sternglanz, 1985). At birth the world subsumes what Zucker et al. (this issue) call psychodynamics; in late infancy, toddlerhood and childhood it also includes social cognition.

The body is the next largest collection of systems found within the world. It is not the foundation of all things, but rather is in the middle—sustained within the world, responding to it, but also reshaping it. Obviously, as I have displaced the idea of predisposing biology (Figure 1), I have also rendered it an untenable concept. To understand this, consider the work of

biologist David Crews. A long and productive career analyzing the role of genes and environment in sex determination has led Crews to espouse a systems view of gonad formation and the regulation of sociosexual behavior. He understands that both complex behaviors and their genetic underpinnings (a.k.a., predisposing biology) are cumulative processes both resulting from past events and setting the stage for responses to future experience (Crews, Lou, Fleming, & Ogawa, 2006; Putz & Crews, 2006). Such a general framework is the appropriate starting point for thinking through the development of human gender variability.

At heart, Ehrensaft's (this issue) true gender self is a biological concept, similar in many ways to the idea that one is born gay. The true gender concept is a homunculus that grows within the world and, in so growing, is shaped by it, much as, I imagine, a plant grown without enough light becomes etiolated and spindly while one raised with good light becomes bushy, green, and strong. But we gain little sense of the systems out of which the true gender self emerges, no sense of the multiple feedback systems which sustain or shape it.

Finally the brain/mind is integrated into the body. Through its sensory and motor abilities the exterior layers of the body bring the world into the central nervous system. Neural plasticity lies at the heart of the matter. A toddler's mind emerges from experience in a particular body and particular world. The brain's very synapses form, take shape, die back, or reconnect in response to the world and body that envelops it. The same is true of the forming neuromuscular connections—links from the central nervous system to the muscles that control motor ability and visceral responses (Thelen, 1994, 1995a, 1995b, 2001).

Chiel and Beer (2007) suggest the following metaphor. Traditionally, behaviorists think of the nervous system as the body's conductor—choosing the program for the players and influencing how they play. But consider instead that the nervous system is only one player in a jazz improv group. The music results from a continued give and take between the player, a continuous interaction between the nervous system, the rest of the body and the environment. If gender identity were the performance piece it would succeed or fail based on the contributions of all the instruments in the band, how they integrate into a coherent system and how the couplings ebb and flow during the time course of the performance.

Gender identity is located in all three interacting networks, a product of the coupling of critical systems—including those postulated by Zucker and colleagues (this issue). I have already suggested that gender-related behaviors and identity formation emerge as a pattern of several cooperating parts; since we need each part to sustain the whole, one is not more fundamental than another. Not a thing, gender identity is a pattern in time. In any one individual, it is shaped by the preceding dynamics and becomes the basis of future identity transformations.

As a set of systems moving through time, gender identity varies in its relative stability. When the components (see following sections) cohere tightly, gender identity is stable. When the elements cohere poorly, the system becomes chaotic; more loosely bound elements are better able to make new connections out of which more stable patterns can possibly emerge. Thelen (2000) phrases it this way: "the components of the system are coupled in a particular way . . . development consists of the progressive ability to modulate the coupling so as to meet different and changing situations . . . There is no point in time when these dynamic processes stop and something else takes over" (p. 8). My working premise is that enormous individual variation exists within the general processes outlined above. By individual I mean both the infant as he or she develops in utero and first appears outside of the womb and the adult-infant dyads, which become the units of self-regulation, mutual regulation and learning through which infants gain an understanding of the world and of self.

I agree with Meyer-Bahlburg (2010) when he laments the lack of a general theory of gender identity development. Corbett (1996, 2009) reminds us that there can be no measurable norm without variance around it. Whether or not some variants—either in the child or in the family unit might get labeled as productive of psychopathology is a different debate. Instead, in this article, I want to refocus discussion on what amounts to the prior question: How does any type of gender identity develop? Even here we confront a prior question: What is gender identity? How, clinically and experimentally, do we make it operational?

In the clinic

Clinical definitions and the criteria from the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev; *DSM-IV-TR*; American Psychiatric Association, 2000) for childhood Gender Identity Disorder create, in essence, a negative film of gender identity. The supposed disorder is said to consist of some combination of: a child's insistence that he/she is the other sex, preference for cross-dressing, persistent, or strong preferences for cross-sex roles in make believe or play, strong desire to participate in the stereotypical games and pastimes of the other sex, and strong wish for playmates of the other sex. The positive print of this image, then, is that gender identity in general must consist of several rather different but interwoven features. The acquisition of a gender identity usually involves the ability to self-identify as male or female, development of feelings about one's genitalia, and a set of pleasures and repulsions that concern styles of dress and play. Thus, gender identity is not a thing, but a name given to a weaving together into a subjective self of aspects of the masculine and the feminine.

Corbett's (1996, 2009) work on boyhood femininity is helpful. First, he rejects a world of binary rules. He sees gender as a dynamic of "gendered

codes, behaviors, and traits circulate and transform . . . within modern families" (2009, p. 103) which reside in a larger, social field of relatives, schools, television, social workers, and more. The family, in this view, is the locale of concrescence for the gender rules and representations encountered in the outside world. "The 'outside' society is indelibly 'inside' the family" (p. 103). Such a notion of the outside has not seriously penetrated the skin of attachment or social learning theory.

Developmental timing

Operationally, gender identity lies partly inside the body—in the shape of sensitivities, desires, preferences, and interests; but it is partly outside the body in that it is always an oppositional concept. Corbett (2009), for example, quotes Robert Stoller that "The first order of business in being a man is don't be a woman" (p. 91). A version of that web we call gender identity is first visible in early toddlerhood and transforms over a period of years. That which we call gender identity in a 3 year old differs in important ways from that which we call gender identity in a 7 year old. As Harris (2005) has so aptly put it, gender is a softly assembled system. In the first five or so years of life, the system itself develops fairly rapidly; thereafter, it usually stabilizes even as it transforms more modestly. Occasionally, the systems that stabilize gender identity fall into chaos and reorganize on a substantially new plain (Martin, as cited in Meyer-Bahlburg, 2010).

Soft assembly contrasts with Zucker and colleagues (this issue) "developmental, biopsychosocial model" which asserts that in the majority gender identity is a "fixed and unalterable" (p. 375) trait. Zucker et al. contrast this fixity with a lack of stability in gender variant kids. Agnostics seem to set up a binary division between majority development, and that which must be explained, that is, deviation from the majority. In contrast, by understanding the acquisition of gender identity and gender expression as a process common to all people, we can weave elements of the agnostics' model into an account in which the processes for both gender variant and gender congruent kids are similar in kind, but differ in timing and or execution. In a process model, gender identity may be stable, but it is never fixed.

THE PRESYMBOLIC PHASE OF GENDER IDENTITY FORMATION

A better understanding of the many and complex pathways that lead to human variation can produce a greater tolerance for variability in children and adults alike. Offering families a deeper conceptualization of the dynamics of gender identity formation in childhood may well be the best therapy

of all. The framework developed in the following pages sets us on the path toward that end.

The newborn infant does not have a self-concept as either male or female. Indeed, on the surface of things, the foremost agenda item for an infant is to attract the adult attention needed for survival. In the first several months all children have a set of tasks, the successful accomplishment of which provides a sound physiological and emotional basis for the emergence of individual gender identity. We postulate that the building blocks that enable gender identity differentiation, including a developing awareness of symbolic and culturally specific gender knowledge, takes shape during the first year of life, while gender identity itself becomes increasingly evident to adult observers during the second.

The achievement of universal developmental tasks (e.g., dyad competence and physiological regulation) provides the skills needed to internalize and symbolize gender; these universal tasks, however, are always individually and culturally specific. The developmental state of the newborn, the emotional and skill states of the parents, their financial resources, the cultural accoutrements of parenthood structured by social gender norms all matter (Fausto-Sterling, García Coll, & Lamarre, in press).

In the beginning there is touch. Through skin-to-skin contact the infant gains hold of temperature regulation. Through touch, the infant develops control of crying and sleeping (de Weerth, Zijl, & Buitelaar, 2003; Korner & Thoman, 1970; Sadeh, Dark, & Vohr, 1996; Weller & Bell, 1965). Early affectional touch improves the quality of reciprocal communication in the adult-infant dyad. Infants who are held and touched have lower circulating stress hormones and careful massage of preterm infants decreases metabolic rate, improves sleep, decreases stress behaviors, and improves immune function. Proper touch is essential to the embodiment of emotions and the development of self (Ferber, Feldman, & Makhoul, 2008; Field, 2010; Field, Diego, et al., 2006; Field, Hernandez-Reif, & Diego, 2006).

Touch co-occurs with vocalizations, facial expressions, body tone, and movement. All these come from the caring adult—usually called the mother, but the importance of other adult-infant contact requires a great deal more study (Lamb, 1977); these behaviors are a response to infant demands but also meet infant needs and enable infant development. The dyadic exchanges affect and attune autonomic, neurological, and hormonal systems of each partner in the dyad (Schore, 1994). By two to three months, parent-infant interactions have a clear structure and timing; Observers note cycles of behavior that include looking, touching and affective expression. At four months, the direct social gaze becomes all important. Periods of synchronous gazing, are often integrated with affectionate touch and vocalization. Importantly, this pattern is culturally specific, more typical of North America and Western Europe. Parents from other parts of the world offer

more bodily contact but less gaze, voice, and object use. As development passes the half year mark, objects become the center of adult-child play; with this transition gaze synchrony lessens and shared attention turns toward an object (R. Feldman, 2007a, 2007b).

In this pas-de-deux, sex and gender matter. From birth to 6 months most studies focus on behaviors related to the function of the mother-infant dyad. In addition to differences in weight, brain size, and motor and sensory development (Fausto-Sterling et al., 2011a), neonatal starting points may include greater average brain cortical maturity in girls (Thordstein, Lofgren, Flisberg, Lindecrantz, & Kjellmer, 2006) and average differences in crying and fussing at birth, 3–6 months (Moss, 1967; Phillips, King, & DuBois, 1978; Sadeh et al., 1996).

A study of the mother infant dyad from birth to 3 months reveals sex-related variability in dyadic communication (Lavelli & Fogel, 2002). If, for example, the critical factors that shape early dyadic communication include levels of neural development, sleep and fuss patterns and physical size, these variables might correlate with the development of dyadic communication patterns. If these variables, in turn, correlated with the sex of the infant as suggested by the findings of Weinberg, Tronick, Cohn, and Olson (1999), then a process by which the development of early sex differences is initiated might be identified. Studies of the gender dynamics of adult-infant dyad formation and coordination suggest that at 3–9 months a mutually engaged state has stabilized in mother-daughter dyads but is more likely to still be unilateral in mother-son dyads. (Hsu & Fogel, 2003; Malatesta, Culver, Tesman, & Shepard, 1989; Tronick & Cohn, 1989; Weinberg et al., 1999).

Parents also bring sex and gender to the nursery. R. Feldman (2007b) found that first time mothers and their 5-month-old infants cycled between low and medium peaks of arousal, with the occasional peak of high positive emotion. The father-infant dyad involved greater emotional and physical arousal. Peaks of laughter and exuberance became more frequent as play progressed. Although, father and infant achieved the same degree of synchrony as did mother and child, when dyads were gender matched (father-son or mother-daughter) synchrony was at its highest. Such differing dyad interactions provide infants with the opportunity to form presymbolic representations, or models, for masculine and feminine styles of activity and emotional output.

To sum up our argument to this point: a) from the beginning (possibly even before birth) the dyadic interaction shapes individual nervous systems in such a way that groups with overlapping but statistically differentiable behaviors start to emerge; b) at birth great individual variability in developmental parameters exists; some of which rises to the level of average group differences between male and female infants; c) from birth on, average sex-related differences in (parent-infant) communication take shape, developing into varied patterns of vocal, physical, and emotional interactions. Between

3 and 6 months other dyadic patterns emerge, some of which appear to be sex-differentiated.

Presymbolic representations of difference

Piaget defined the presymbolic stage as lasting roughly from birth to 18 months (Piaget & Inhelder, 1972). Relying primarily on sensorimotor representations, the infant in this period interacts with the world through actions such as crying and regulated gestures. Infants enter the world with surprisingly advanced capabilities. Using auditory, visual, motor, touch, and circadian insights infants take the measure of their surroundings even in utero. As they measure, they also learn to manipulate the adults whose care they need, and begin the life-long process of honing a capacity for self-regulation (Beebe, Lachmann, & Jaffe, 1997). The environmental trappings of gender, from the voices, faces, modes of holding and touching, dress, hair, and grooming, to the colors in the room, the toys offered and the baby clothing used, are ever present. From birth or before an infant absorbs them, commits them to memory, develops expectations about them, and receives bodily messages about their own sex and gender.

Beebe and Lachmann (1994) articulate three working hypotheses about how presymbolic representations of social relatedness form in infancy. First, ongoing regulations in adult-infant interactions create regularities that organize an infant's experience. Second, infants further learn to regulate their environment through a process of disruption and repair. An expectancy (e.g. feeding at a certain hour) may be disrupted, the infant expresses distress, adults repair the disruption by (belatedly) feeding or otherwise attempting to comfort the infant. Finally, during heightened affective moments infants respond to heightened adult emotion evident in facial or vocal expression with an arousal pattern measured physiologically as changes in brain waves, heart rates and/or respiration. The high moments of excitement in father-infant dyad play is one example. The differential between maternal and paternal interactive styles could be one of the early inputs that shapes presymbolic representations of gender and links them to emotional development.

Beebe and Lachmann (1994) believe that both self-representation (obviously relevant to the emergence of a sense of oneself as male or female) and object representations (with regard to gender, an understanding of familial and cultural gender categories), result from "the expected moment to moment interplay of the two partners (p. 131). Representations are "persistent, organized classifications of information about an expected interactive sequence" (p. 131). Infants and children base representations on past interactions, but continuously modify and restructure them as the environment—including the human interactions within it—transforms.

How might the idea that infancy involves a continuous organizing process based on developing expectancies, their disruption and their repair, apply to gender development? The experiences that organize gender might include, first, the daily physicalities of care. How do parents carry, touch, sooth, and play with their children and how do specific infant nervous systems experience the resulting physical sensations? What pleasurable or discomforting expectations develop from sensory input including emotive faces, voice timbre and expression, touching while playing, bathing (including genital touch) and feeding? Are these linked in ways that differentiate gender? At a more removed level, male and female adults in the infant environment shape infant expectations. From the start, toys are available in different types and quantities, the colors and tactile features of clothing and stuffed animals also shape infant expectations and are highly differentiated even for neonates (Rheingold & Cook, 1975; Shakin et al., 1985). Thus, taking seriously Beebe and Lachmann's (1994) framework for the infant phase of representing and individualizing opens a little-explored field of study for those interested in the emergence of gender identity in toddlers and beyond.

As infants perceive regularities in their experience they begin to form categories. In the case of gender, both visual and auditory categories can be noted by 6–9 months (faces and voices) and by 12 months cross-modal abilities emerge including an association of male and female voices with gender related objects (Fausto-Sterling, García Coll, & Lamarre, in press). By the time an infant has become a toddler, gender knowledge has progressed from presymbolic representations such as recognition and association of voice pitch and faces to a far more sophisticated, increasingly symbolic representation of gender in self and others. It seems likely that this transition from presymbolic to symbolic and to increasingly internalized representations of gender, which must start in the vicinity of one year of age and carry on for several years, is an especially important period for understanding the developmental dynamics of gender identity.

FROM PRESYMBOLIC TO SYMBOLIC REPRESENTATIONS OF GENDER

R. Feldman (2007a) and others (see, e.g., (Beebe & Lachmann, 1994) argue that symbolic representations emerge toward the end of year one as specific infant responses to the training afforded by perceptual, affective and motor experiences organize into coherent structures Early synchrony between parent and child correlates positively with more complex symbolic play at age 3. At 3 and 9 months it correlates with how well a child can use words to refer to mental states such as thoughts or feelings attributed to self or others, while parent-infant synchrony at three months predicts how well a five year

old can perceive that his or her own emotions might differ from those of others.

Gender differentiation becomes most evident as children develop symbolic representations. Gender specific toy preference, for example, begins to emerge at about one year of age (Jadva, Hines, & Golombok, 2010). At 18 months, children are startled at culturally gender inappropriate images (e.g., a man putting on makeup) and have also developed a system of gender-related metaphors (Poulin-Dubois, Serbin, Eichstedt, Sen, & Beissel, 2002). Gender identity itself—which lies at the heart of the discussion—comes on line gradually. Before 2 years of age, children learn to label others as boy or girl—using external (symbolic?) features such as hair length or dress. They next develop the ability to self-label and can exhibit a nonverbal gender identity. However, the notion that gender itself is stable and sex constant as children grow to adulthood does not usually take root until a child is 5 or 6 years old (Fagot, 1995; Fagot & Leinbach, 1989, 1993; Fagot, Leinbach, & Hagan, 1986; Fagot, Leinbach, & O'Boyle, 1992).

Gender metaphors and words

Zosuls et al. (2009) studied the development in toddlers of the ability to utter basic gender labels (girl, boy, man, lady). At 17 months, about a quarter of the kids they studied had used at least one verbal label, and by 21 months this number had increased to 68%. However, boys developed this ability more slowly. In this same time period, children accurately associate gendered objects such as a fire hat or a tiara with male or female faces and they have acquired a view about what links, symbolically to one or the other sex (Eichstedt, Serbin, Poulin-Dubois, & Sen, 2002). Such symbolic knowledge seems to affect children's' belief systems about which sex should play with which toys. Eichstedt et al. (2002) suggest that symbolic gender knowledge in the pre-two year old set can drive or enhance the acquisition of a variety of gender stereotypes.

Oppositional knowledge

In this same time period, we first detect a surprisingly sophisticated understanding of gender roles. When asked to choose either male or female dolls to act out activities deemed by adults to be masculine stereotyped, feminine stereotyped or, or gender neutral, 2-year-old girls used the male dolls to play act masculine activities 70% of the time. For neutral activities, they used the male doll 30% of the time and for feminine-stereotyped activities they used the male dolls 48% of the time. Despite a range of variability from 23 to 95%, these 2-year-old girls clearly had some knowledge about gender stereotyped behavior. The same cannot be said for the boys, who used male and female dolls pretty much equally regardless of the task's stereotypy

(Poulin-Dubois & Forbes, 2002). In studies using a looking rather than a playing method, however, both male and female 2-year-olds looked longer at photos of women behaving in gender-inappropriate ways, such as hammering a nail, fixing a toy, or taking out the garbage, but seemed unimpressed by photos of a man putting on lipstick, feeding a baby, or ironing (Serbin, Poulin Dubois, & Eichstedt, 2002). These studies suggest that even 2 year olds know some pretty complicated things about gender roles. As they also develop the capacity to label themselves according to gender, they may put this knowledge to use in building their own identities.

Self-labeling

Zosuls et al. (2009) found a significant relationship in months 17–21 between the ability of kids to label themselves as a boy or a girl and increased levels of gender-typed play. Thus, the application of some knowledge of gender in the world to a sense of self happens between the second and third year of life and provides self-feedback on behavioral preferences. Some argue that this is the moment in which a child acquires a gender identity. For Ehrensaft (this issue), this might be the point in time in which a child presents his or her parents with a true gender self. But clearly, this version of gender identity, gradually acquired as knowledge about experienced gender roles, forms a dynamic network which gradually ensnares the child.

INTERNALIZING A GENDER SELF

Harris (2005) states it beautifully:

> Brought into an intense, embodied responsiveness and contact with the material world, caught up in the conscious and unconscious reverie of parents, prenatally already an object of intense fantasy, a child finds the experience of self within a relationship in which he or she is already seen . . . The internalization . . . of the gender/body mirror becomes a part of the child's procedural knowing, available for many complex remappings and reassemblies in the course of development. (p. 181)

Children with individualized nervous systems, genes, hormone levels, and physiologies are born into a gender differentiated world. Even during the last weeks of uterine life, fetuses can perceive gender outside the womb. These differences take shape or disappear at first through the dyadic formations of early infancy and with time, through increasingly independent knowledge acquisition and behavioral patterns. Gender is never absent. There is never a point at which it begins. Still, the $64,000 question remains: How do increasing levels of gendered embodiment, knowledge

about gender in the world, the growing abilities to self-label and modulate behaviors to correlate with labels, become part of an internal sense of self?

In Figure 3, we recap the elements contributing to presymbolic gender embodiment and representation, indicating a period of transition—critically

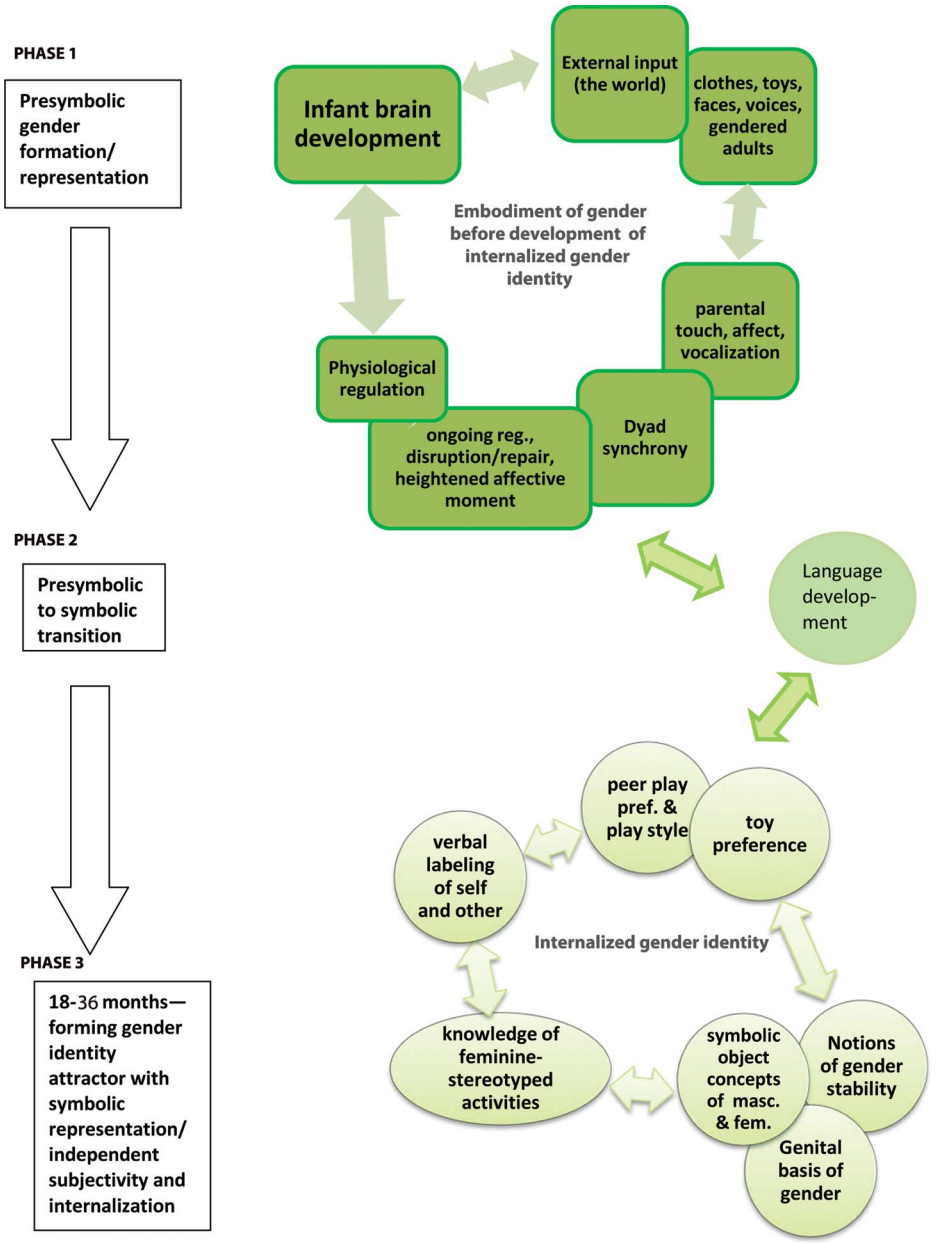

FIGURE 3 Three phases of gender representation and identity internalization (color figure available online).

mediated by language development—to symbolic gender knowledge. Such knowledge builds on previous embodiment and enmeshes in a web of behavior, self-labeling and preferences that are the subsystems of that dynamic web we call *internalized gender identity*. In each developmental phase, there are dynamically interacting subsystems; but the developmental time line is unidirectional.

Psychoanalyst Susan Coates distilled several important characteristics from a study of over 130 young boys (2–4 years of age) brought to therapeutic attention because of their cross-gendered behaviors, interests or identities. First, the boys' cross-gendered behaviors emerged during a critical period of development (2–4 years). Second, GIDC often appeared and consolidated quite suddenly, and, for the boys who came to Coates' practice, frequently (but not always) in the context of some kind of psychic trauma. Coates associated several biopsychological markers with these boys including a sense of physical fragility, the avoidance of highly physical play, anxiety in new situations, high sensitivity to others' emotional states, high vulnerability to separation or loss, an unusually acute ability to imitate others, and extraordinary sensory sensitivity to sound, color, texture, smell and pain (S. Coates, 1992; S. W. Coates & Wolfe, 1995).

Analyst Ken Corbett (1996) argues that boyhood gender nonconformity does not represent a continuum of femininity. Instead, he suggests these boys fall on "a continuum of ego integration and psychic structure" in which GID and gender-nonconforming boys may be equally feminine, but in the latter group "the femininity is contained within a more stable psychic structure" (p. 438). Corbett insists that the very category of Gender Identity Disorder demands that we develop theoretical approaches that explain how the psyche, the soma and the social build one another.

As should be clear, I agree with Harris and Corbett (and thank Coates for her expanded framing, which initially broadened my own perspective on early gender identity development) that to understand the emergence of gendered behaviors and their attachment (or not) to natal sex we need first to become more knowledgeable about the presymbolic, dyadic processes through which gender becomes embodied in infancy. Such embodiment forms the basis for the transition to symbolic understandings of gender as a relational and oppositional concept coincident with the internalization and dynamic stabilization of gender as a component of the self.

WHAT NEXT?

A lot of work remains to fully develop and shape these ideas. Beebe and colleagues (Beebe, Jaffe, et al., 2010; Beebe & Lachmann, 1994; Beebe, Lachmann, et al., 1997) have published a series of studies of dyad formation and interactions. What still must be done here is to incorporate sex of infant

as a variable into such studies. Some such work exists, but more is needed (Fogel, Dickson, et al., 1997; Fogel, Garvey, et al., 2006; Fogel & Thelen, 1987). To understand the dynamics of gendered embodiment investigations of presymbolic gender formations must be longitudinal.

Dyad formation and input from the physical environment likely affect brain development, but neither has been studied in relationship to neural growth and development. While the measurement of functional brain activity in infants is still fairly crude, the development of noninvasive scanning methods seems to be coming into its own (Bell & Fox, 1992; Dawson et al., 1999; Kuhl, 2010). It should be possible to link the development of dyad synchrony to brain development both generally and with regard to gender. Similarly, studies testing the importance of exposure to a skewed physical environment (e.g., many toy cars, few dolls) to brain activity and development during the first year of life should illuminate gendered developmental systems.

More detailed knowledge of gender formations and embodiment during infancy should enrich our thinking about the transition from presymbolic to symbolic gender representation and the concomitant internalization of identity. Writ large this is a question about how sense memories and bodily knowledge transform into psychic knowledge. In terms of gender, for the time being, it makes sense to operationalize identity via the study of gendered behaviors and self-assessments. If the transformation really is a dynamic system, then we might expect this period to be chaotic and unstable relative to the stability of well-formed dyadic synchrony that precedes, and the relative rigidity of gender identity evidenced by, children by the time they are 4–5 years of age (Hollenstein, 2007).

As the developmental details and dynamic interactions of phase 1, the transition and phase 2 come into clearer focus, a supportable theory of gender identity development will emerge, allowing us to get a handle on individual variations in identity formation and expression. Given the number of subsystems contributing to the outcome as seen by age 5 or so, it seems likely that several roads can lead to similar-appearing variations in gender identity. Furthermore, no single item—be it parental behavior or infant genes—can be held responsible for the outcome. Improved understandings of the many and complex pathways that underlie human variation can lead to a greater tolerance for variability in children and adults alike. Offering families a more profound knowledge of the dynamics of gender identity formation in childhood may well be the best therapy of all.

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