

## COMMENT

# Critical Reflections on Evolutionary Psychology and Sexual Selection Theory as Explanatory Account of Emergence of Sex Differences in Psychopathology: Comment on Martel (2013)

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Martel (2013) proposed a metatheory, based on sexual selection theory and broad evolutionary psychological (EP) principles, to account for well-known sex differences in the emergence of common behavioral and certain internalizing disorders across childhood and adolescence, respectively. In this comment, I first enumerate several strengths and then offer 2 primary critiques about Martel's proposal. Martel provides an exceptional, integrative review that organizes several disparate literatures that hold promise to enhance understanding of such sex differences. At the same time, I raise critical questions regarding EP generally, and sexual selection theory specifically, as the metatheoretical framework chosen to bind together these different influences and mechanisms as drivers of the sex difference in different psychopathologies. Indeed, it is not clear that EP is necessary—nor does it provide unique explanatory power—to explicate the emergence of sex differences in internalizing and externalizing disorders among youth. Moreover, Martel's EP-based proposal pertains to adolescent-onset depression and social phobia but does not provide an explanation for known sex differences in other common childhood-onset and early adult-onset anxiety disorders.

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There's nothing so practical as a good theory. (Lewin, 1951, p. 169)

We are to admit no more causes of natural things than such as are both true and sufficient to explain their appearances. Therefore, to the same natural effects we must, so far as possible, assign the same causes. (Newton, 1726/1972, p. 202)

Martel (2013) has provided an exceptional integrative review of many of the scientific fields and literatures that hold promise for unlocking the enduring mystery of how sex differences in many common emotional and behavioral disorders emerge among children and adolescents. She has concisely reviewed the descriptive epidemiology that establishes sex differences in the prevalence of multiple, albeit not all, childhood and adolescent psychopathologies. Her theoretical review article postulates that sexual selection theory, grounded in an evolutionary psychology (EP) framework, can succinctly explain the sex differences in the prevalence of common youth externalizing and internalizing disorders. Given the enormous personal and societal burden of these prevalent emotional and behavioral problems, understanding and further explicating in a developmentally informed manner why these psychopathologies have clear, well-replicated, sex-differentiated patterns is a significant, high-priority area of inquiry.

In addition, knowledge about causal factors underlying sex differences opens a window that can offer vital clues to understanding the broader developmental psychopathological etiological pathways of these common internalizing and externalizing disorders. Thus, studying how sex differences in common psychopathologies develop provides essential value both toward advancing the basic clinical scientific knowledge base and for connecting such information to its clear translational import. In other words, enhanced understanding of developmental pathways contributing to the emergence and maintenance of these disorders can, in turn, inform the development and refinement of new and improved interventions to reduce the significant toll that these all-too-prevalent emotional and behavioral problems exact for individuals, their families, and society.

Indeed, one intriguing possibility is that enhanced personalized interventions (Insel, 2009), whether psychosocial, pharmacological, or more directly brain based, can potentially be tailored in a sex-specific manner. Such personalized, sex-specific medicine, which can be grounded in knowledge garnered from basic developmental psychopathological research, holds the potential to unearth core etiological processes and developmental pathways that may underlie these sex-linked psychopathologies. As but one example, Stark, Herren, and Fisher (2008) have developed and provided strong evidence for the efficacy of a girls-only cognitive behavioral therapeutic (CBT) group (ACTION) to treat adolescent girls' depression (e.g., Stark et al., 2008). ACTION is based on core CBT principles that are presumed to operate universally in combination with a more nuanced understanding of adolescent

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girls' psychosocial, biological, and interpersonally oriented cultural ecology, grounded in well-established evidence of these biopsychosocial influences among girls (e.g., [Rose & Rudolph, 2006](#)). Stark's girls-only CBT groups provide an exemplar of how basic clinical scientific knowledge, aimed at understanding the emergence of sex differences in a particular psychopathology, can lead to the development and empirical examination of a sex-specific intervention that may provide relatively enhanced intervention effects compared with a one-size-fits-all, nonpersonalized intervention approach.

In this commentary, I first highlight notable strengths of [Martel's \(2013\)](#) review. I then offer two primary critiques regarding her theoretical proposal. In particular, the core critical analysis focuses on philosophy of science concerns related to Martel's application and use of EP as a broad metatheoretical framework. While striving to synthesize many varied and complex findings into fewer, simpler universal laws and underlying processes represents a noble effort, Martel's proposal based on EP-based sexual selection theory falls short of its ultimate potential and may not be necessary for the primary purpose of understanding how sex differences in psychopathologies emerge.

### Strengths

The first strength of [Martel's \(2013\)](#) work is that it provides an excellent review of the broader literature in sex differences in multiple psychopathologies, including some common externalizing and internalizing disorders, as opposed to a singular focus on a theoretical account aimed at explaining the sex difference in a single disorder (e.g., depression; [Cyranski et al., 2000](#); [Hankin & Abramson, 2001](#); [Keenan & Hipwell, 2005](#); conduct problems; [Moffitt, Caspi, Rutter, & Silva, 2001](#)). There are not many thorough reviews of the broader literature on sex differences in common emotional and behavioral problems (for some exceptions, see [Rutter, Caspi, & Moffitt, 2003](#); [Zahn-Waxler, Crick, Shirlcliff, & Woods, 2006](#)). Thus, Martel provides an important contribution to the field by comprehensively reviewing various aspects of the broader sex differences in youth psychopathology literature.

Second, [Martel \(2013\)](#) adopts a developmental psychopathology perspective to some degree. She focuses on factors and processes that may explain the emergence of the sex difference in multiple common psychopathologies among children and adolescents, when many of these sex differences are known to diverge. It is important to pay particular attention to the development of these sex differences, because once these sex-linked psychopathologies have emerged, these problems tend to be maintained over time as stable, chronic patterns over the life course ([Rutter, Kim-Cohen, & Maughan, 2006](#)). I point out, however, that whereas Martel's focus on the emergence of these sex differences in childhood and adolescent disorders is commendable and noteworthy, a true developmental psychopathological perspective would provide a comprehensive account of these phenomena over the life course ([Cicchetti, 2006](#)), including the processes that contribute to the emergence, maintenance, and desistance of these sex-linked symptom patterns from childhood into adolescence and then throughout adulthood. For example, Martel's theory does not articulate why the well-established sex difference in depression, which emerges in early adolescence and persists through most of adulthood ([Han-](#)

[kin & Abramson, 1999](#)), disappears in later adulthood (e.g., after age 65; [Nolen-Hoeksema, 1990](#)).

Third, [Martel \(2013\)](#) reviews and integrates disparate, previously disjointed literatures that have provided insight into possible causes for the emergence of the sex difference in multiple psychopathologies among youth, including hormonal factors (e.g., testosterone, estradiol, oxytocin), genetics (e.g., dopaminergic and serotonergic systems), personality traits (e.g., negative emotionality, sensation-seeking, disinhibition), and components of stress reactivity (e.g., rumination, cortisol). The author's up-to-date, concise literature review of each of these different fields and what is known about each in relation to possibly explaining sex differences in youth psychopathologies represents in itself a significant and important contribution.

Last, beyond the clear value and substantial contribution that [Martel \(2013\)](#) makes in reviewing each of these different explanatory literatures, she sought to consolidate and integrate each of these influences and factors into a single, logically coherent, conceptual framework that has the potential to account for the emergence of sex differences in common emotional and behavioral psychopathologies—a significant and bold offering. Consistent with Occam's razor, the most parsimonious explanation that makes the fewest assumptions should be preferred among alternative, competing hypotheses. From a philosophy of science perspective, preference for simpler theories, relative to more complex ones, is desirable because they are more easily tested and falsifiable ([Popper, 1959](#)). From this perspective, it represents a thought-provoking advance to postulate a single, simpler theoretical account that could explain the development of sex differences in multiple psychopathologies and coherently synthesize the different risk factors and processes as articulated and substantiated from various subfields and separate literatures. In principle, aiming to create a single theory potentially capable of accounting for the development of sex differences in common youth psychopathologies is desirable relative to having different unconnected mini-theories, grounded in disparate fields, focused on a more narrow set of risk factors and processes (e.g., only temperament; only hormones) as explanatory accounts for a single disorder, as is presently the case in the literature on sex differences in psychopathologies.

### Concerns and Critiques

Despite these salient strengths, in the remainder of this commentary I discuss two main concerns and critiques. First, continuing the philosophy of science theme and principled goal of attaining a single, simple theoretical model, it is essential to comment on EP and sexual selection theory as [Martel's \(2013\)](#) chosen metatheoretical perspective. EP has been the subject of considerable debate and critique, and much ink has been spilled debating its pros and cons ([Buss, 2005](#)). Martel is clearly aware of much of this heated debate and controversy and does her best to address aspects of it directly and in a straightforward manner. Still, it is worth discussing some of the concerns and critiques that various scholars have leveled against the broad EP framework. In particular, this commentary points out particular concerns that the broad EP metatheory may have for explicating the sex difference in various psychopathologies among youth. While many critical analyses have been pronounced against EP proposals broadly, for this

commentary three main concerns are considered about EP as the overarching metatheoretical perspective chosen to organize the various risk factors and processes drawn from these different subfields.

First, prior critics have questioned how well EP accounts can provide a priori hypotheses, as opposed to merely consolidating established facts into a convenient “just so story.” The phrase, based on Rudyard Kipling’s (1902) book of fables—*Just So Stories*—that contained fictional tales for children, such as why the leopard has spots, has become synonymous with an unfalsifiable scientific tale concocted to explain post hoc biological, cultural, or behavioral findings and features. Specifically, the criticism exists that evolutionary explanations of traits, originating in the Pleistocene era (roughly between 1.7 million and 10 thousand years ago), have been postulated by various EP theorists (e.g., Buss & Hawley, 2011; Cosmides & Tooby, 2013; Pinker, 1997) to be adaptive and to have evolved during the Stone Age to solve survival and/or reproductive problems encountered by hunter-gatherer ancestors. These traits, and the mental modules responsible for solving these problems, are posited to have been preserved to the modern day. Martel (2013) is clearly aware of this type of critique and provides relevant references in response to such anticipated concerns (e.g., Geary, 2002; Ketelaar & Ellis, 2000). She addresses these concerns as well as possible, and it is commendable that she offers some specific a priori hypotheses. However, it remains the case that many scholars (e.g., Gould & Lewontin, 1979; Halpern, 1997; Panksepp & Panksepp, 2000) have criticized EP accounts because they cannot provide truly a priori, empirically falsifiable hypotheses. Certainly, readers can politely agree to disagree about this metacritique of EP models. Moreover, the particular hypotheses offered by Martel mostly restate (and organize within sexual selection theory) what is already established about explanations for the emergence of sex differences in particular behavioral and emotional disorders among youth.

Whereas august philosophers, such as Popper (1959), preferred simple theories over complex ones, the main reason for this predilection relates to the essence of any vital theory: producing risky hypotheses (i.e., those with a “grave danger of refutation,” Meehl, 1978, p. 817) that contain precise point predictions (e.g., it will rain 2.8 in. on Tuesday between 4 and 6 P.M., as opposed to a weak, vague prediction of 20% chance of rain sometime during Tuesday; Meehl, 1978), which are capable of being falsified. While Martel’s (2013) EP metatheoretical account makes a priori predictions, a careful reading of these hypotheses suggests that few of these are novel, precise hypotheses that break new ground and possess the quality of “grave danger of refutation.” Rather, much of the article collates established findings from various literatures into an organized model within an EP framework. In other words, the hypotheses proffered are mostly summations and integrations, across different levels of analysis and across different literatures, of well-established findings and conceptually proposed theoretical accounts. As such, the EP metatheoretical account of Martel (2013) does not offer substantially risky, precise, new predictions.

Although her hypotheses can be falsified, the primary concern is that her hypotheses are not convincingly specific to sexual selection theory. In other words, if all of these hypotheses were disproved by evidence, then her model would indeed be falsified. Yet, if all of her hypotheses were supported, then virtually nothing specific would have been learned about her preferred EP-based

sexual selection theory, because many other theories of the emergence of sex differences in individual psychopathologies make similar predictions. In short, a strong theory needs to make specific point predictions (i.e., it will rain 2.8 in. Tuesday between 4 and 6 P.M.) and postulate distinct influences and mechanisms that lead to this prediction.

Second, the specific feature of EP’s sexual selection theory, on which Martel (2013) bases her theoretical account to explain sex differences in psychopathology, has been the subject of considerable critical analysis. Specifically, Martel highlights the three domains subject to sexual selection processes: psychological/social, biological, and physical. Among these, she organizes her EP-based metatheory around the psychological/social domain, which includes “nonverbal and verbal skills, cognition” (p. 1225). Given her predominant emphasis on this area for the theory, it is appropriate to consider the critiques that scholars have made regarding this core domain.

For example, Buller (2005) carefully appraises three notable breakthroughs that EP has celebrated as important, including a cheater-detection module, sex differences in jealousy, and motivational reasons underlying greater child abuse by stepparents compared with biological parents. In his analysis, Buller details the logical and evidentiary problems with each of these findings, and accordingly questions the general EP paradigm—that is, the perspective that specific mental modules evolved during the Pleistocene era to solve critical social, behavioral, reproductive, and competitive problems, and that these cognitive modules have been maintained to the present day. Of notable concern for Martel’s (2013) application of sexual selection theory as a metaexplanatory account of sex differences in common psychopathologies, Buller (2005) carefully evaluates the evidence accumulated in support of the EP hypothesis regarding sex differences in jealousy, and the definitive evidence needed to support this EP hypothesis is lacking. In sum, dismantling of this sex differences hypothesis is particularly problematic for Martel’s proposal because Buller’s main point is that it is not clear that hypotheses based on sexual selection theory have been supported, nor is it likely they will be substantiated in the future.

The third concern is that Martel’s (2013) application of EP as an overarching metatheory may not be necessary. Given the above-noted critiques raised about EP generally, and aspects of sexual selection theory in particular, it is questionable whether EP and sexual selection are even needed to explicate how sex differences work in common emotional and behavioral psychopathologies. The elucidation and integration of various multilevel influences and processes, ranging from temperament to hormones to genetic influences, serve an important contribution and advance the field’s understanding of the emergence of sex differences in these psychopathologies among youth. It is not clear that EP and sexual selection theory, as a higher order metatheoretical layer, add much to the explanatory power and coherence of the author’s main purpose: to understand the risk factors and mechanisms that drive the sex difference in common psychopathologies. Although EP and sexual selection theory might tie together Martel’s core etiological risk factors and mechanisms (genes to neurotransmission to hormones to temperament and cognition in relevant cultural, environmental contexts), it is not certain that EP and sexual selection theory are necessary to do so, nor that these metatheories substantially advance understanding of sex differences in psychopathol-

ogy beyond the “just so story” offering a possible framework to connect these etiological influences.

As an illustration, medicine explicated how the human heart functions centuries before Darwin’s evolutionary theory was even proposed. Analogously, would the metatheoretical gloss of EP and sexual selection theory be necessary and add much to the field’s understanding if the various factors, processes, and influences that combine together across multiple levels were understood to precisely predict how sex differences in common psychopathologies emerge? If, from a philosophy of science perspective, specific point predictions (Meehl, 1978) could be made and confirmed regarding which particular boys and girls would exhibit which particular emotional and behavioral symptoms, when, and for what reasons (i.e., how), then a truly substantial breakthrough would have been achieved. Given medicine’s clear success in understanding how the heart works, without needing to appeal to any evolutionary metatheoretical framework, one suspects that psychology and clinical scientists would believe success had been realized if the how, for whom, and when questions that are essential to explicate the developmental pathways for sex differences in common psychopathologies could be answered, with or without EP as metatheory.

In addition to concerns about the utility of EP as a metatheoretical framework, Martel’s (2013) conceptual account does not explain the sex difference in as many forms of psychopathology as a truly strong, comprehensive metatheory should. Martel states that “most ‘internalizing’ disorders with a peak onset during adolescence have a female-biased prevalence rate” (p. 1223) and that “several anxiety disorders, most particularly social phobia, have peak age of onset around age 13” (p. 1223). Yet several anxiety disorders, including posttraumatic stress disorder (PTSD), separation anxiety disorder (SAD), generalized anxiety disorder (GAD), and panic disorder (PD), do not follow the sexual divergence and prototypical age-of-onset pattern that is the focus of Martel’s model. For example, Kessler et al. (2005) in the National Comorbidity Study Replication reported median age-of-onset patterns for the following: SAD at age 7, specific phobias at age 7, PTSD at age 23, GAD at age 31, and PD at age 24. Similarly, the World Mental Health Survey, which included over 85,000 face-to-face interviews across 28 countries (Kessler et al., 2007), revealed that the median age of onset for phobias and SAD is in the 7–14 age range, whereas other anxiety disorders (PD, GAD, PTSD) have a median age range of 25–53.

These epidemiological data demonstrate that many anxiety disorders do not necessarily follow a prototypical sex- and age-linked trajectory. Moreover, Martel’s (2013) theory does not apply to explaining the clear sex difference in many of these anxiety disorders (phobias, SAD, PTSD, GAD, PD). In other words, as Martel clearly states in her article, her proposal focuses on providing an explanation only for the emergence of the sex difference in depression and social phobia during adolescence. Thus, her sexual selection theory has a relatively narrow focus and scope for explaining the emergence of sex differences in depression and social anxiety alone. Seemingly, a prime rationale and possible advance to postulating an overarching metatheory is that it offers the promise of a simple, potentially all-encompassing model that could account for many of the varied, complex aspects of the emergence and timing of sex-linked patterns in common internalizing and externalizing psychopathologies. Although Martel

(2013) reasonably and clearly articulated the predominant focus of her article toward explaining “common forms of developmental psychopathology that demonstrate striking sex differences in prevalence” (p. 1223) and specified its focus predominantly on depression and social anxiety, the omission of a large swath of common internalizing disorders with an equally pronounced sex difference but without a modal age of onset in adolescence is a key limitation.

## Conclusion

In summary, the thought-provoking article of Martel (2013) makes a notable and valuable contribution by succinctly reviewing many, often traditionally disconnected, literatures that bear upon a potential explication of the emergence of sex differences in selected emotional and behavioral disorders among youth. Yet Martel’s appeal to EP-based sexual selection theory as the metatheoretical glue that is postulated to bind together the disparate risk factors and mechanisms aimed at explaining these sex differences falls short. Although there is clear value and need for a simple, coherent, higher order conceptual framework to logically synthesize the complex and distinct influences related to the puzzle of sex differences in psychopathology, my contention is that the application of EP-derived sexual selection theory for this challenge is problematic and lacking.

At present, the field has various, disconnected mini-theories for separate psychopathologies (e.g., depression, anxiety disorders, externalizing problems). Each provides suitable, albeit incomplete, explanatory power toward explicating the emergence of sex differences in individual psychopathologies. A similar set of circumstances exists in other areas of scientific inquiry. For example, in theoretical physics, the holy grail is to provide universal laws, presumably in the form of a grand unified theory, that can coherently and fully merge classic Newtonian mechanical physics (which does an excellent job of providing accurate, precise point predictions of large-scale phenomena) with quantum field theory (which equally well delivers exact, detailed explanations for phenomena at the atomic and subatomic particle level). Both classical mechanical physics and quantum field theory have withstood numerous empirical examinations and survived grave danger of refutation: Each model performs exceedingly well at predicting how phenomena at its respective scale operate. Thus, there is considerable value in having theoretical models, focused at the right level given the state of knowledge, that can accurately account for some (even though not all) aspects of particular areas of inquiry.

Just as with theoretical physics, the ambitious goal for developmentally oriented clinical scientists should be to strive toward a simpler theoretical account that could serve as a unified theory capable of proffering universal laws that explicate how and when the sexes diverge in common emotional and behavioral problems over the life course. Such hypotheses would have to deliver precise, detailed point predictions that can be falsified. Until the time when such a unified theory is available, it is notable that impressive gains have been made in understanding various risk factors and influences contributing to the emergence of particular emotional and behavioral disorders. Martel’s (2013) article notably underscores these advances in knowledge and moves the field forward with an excellent review of the descriptive phenomena and multiple mini-theoretical accounts, as presently available, that

will prove important for an eventual, more comprehensive understanding of how girls and boys develop certain psychopathological symptoms. It remains an important, albeit unfinished, challenge for the field to bridge these separate accounts into a simpler, coherent conceptual model.

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