

# Adolescent Acne and Disparities in Mental Health

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**ABSTRACT**—*Acne is a hallmark of adolescence, affecting 85% of youth between the ages of 12 and 25 worldwide. Perhaps because of its ubiquity and minimal impact on physical functioning, acne is often dismissed as a time-delimited cosmetic nuisance and has been summarily neglected by developmental scientists. However, emerging evidence suggests that acne is associated with clinically significant psychological adjustment problems, including depression and anxiety. Adopting an interdisciplinary approach that bridges developmental and dermatological science, we reposition acne as a prominent source of psychological maladjustment and health disparities in adolescence. Specifically, we propose that females and youth with darker skin may be disproportionately affected by the pernicious psychological effects of acne. Reconceptualizing adolescent acne as a developmentally and psychologically meaningful dermatologic disease with effects shaped by culture and health care disparities will advance our understanding of youth’s mental health.*

**KEYWORDS**—*acne; adolescent; gender; health disparities; mental health; skin color*

Acne is typically viewed as a developmentally normative, peripheral, and functionally neutral correlate of puberty. However, growing evidence suggests that this hallmark of adolescence is, in fact, a developmentally and psychologically meaningful dermatologic disease (Tuchayi et al., 2015). *Acne*

*vulgaris*, caused by inflammation of hair follicles by *Propionibacterium acne* (Williams, Dellavalle, & Garner, 2012), ranks among the top 10 most prevalent diseases in the world (Tuchayi et al., 2015). Rates of severe acne increase dramatically across adolescence (Silverberg & Silverberg, 2014), with approximately 20% of teenagers experiencing moderate to severe acne, and 85% of 12- to 25-year-olds reporting recurrent bouts of acne (Bhate & Williams, 2013). Perhaps because of its ubiquity and typically minimal impact on *physical* functioning, acne is often dismissed as a time-delimited cosmetic nuisance (Williams et al., 2012) and has been largely neglected by developmental scientists, including researchers studying puberty. However, as one dermatologist noted, “acne is not a killer, but it can scar people literally and psychologically” (Brody, 2019, p. 5).

The persistent exclusion of acne from the lens of developmental science is particularly glaring given emerging evidence that the most immediate and pernicious effects of acne are, in fact, psychological. Acne is associated with clinically significant increases in depression, anxiety, and suicidal ideation (Purvis, Robinson, Merry, & Watson, 2006; Silverberg & Silverberg, 2014), declines in quality of life (Dunn, O’Neill, & Feldman, 2011), and increases in social maladjustment (Halvorsen et al., 2011). Moreover, the psychological ramifications of acne are likely to be distributed nonrandomly as a function of female gender (Hassan, Grogan, Clark-Carter, Richards, & Yates, 2009; Smithard, Glazebrook, & Williams, 2001; Tan et al., 2008) and darker skin (Davis & Callender, 2010; Taylor, Cook-Bolden, Rahman, & Strachan, 2002). Thus, developmental research on acne is urgently needed, particularly among adolescents, for whom both physical appearance and psychopathology take on increased salience, and among diverse groups of youth.

In this article, we highlight the opportunity for interdisciplinary research on acne within a developmental science framework to clarify whether, when, how, and for whom acne exerts toxic effects on psychological health. In the first section of the article, we describe the developmental course of acne and its relation to puberty. In the second section, we review empirical evidence on the nature and magnitude of acne’s effects on youth’s mental health. In the third section, we look at health

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disparity in the association between acne and mental health, with females and youth with darker skin as groups at disproportionate risk for acne-related psychological maladjustment. Finally, we illuminate promising directions for research and explicate how research in developmental science can inform health care policy, treatment regulation, and prevention efforts to promote adolescent health and well-being.

### THE DEVELOPMENTAL COURSE OF ACNE

Although colloquially recognized as an adolescent condition, acne can occur at any age; it affects not only adolescents, but also newborns, infants, preadolescents, and adults (Tom & Fallon Friedlander, 2008). Neonatal acne affects approximately 20% of newborns, whereas infantile acne is less common and typically emerges between three and six months (Tom & Fallon Friedlander, 2008). Largely quiescent across childhood, acne often appears or resurges at the onset of puberty and peaks in late adolescence. Escalations of adolescent acne likely follow from elevated androgen production during puberty, which leads to increased sebum, the consequent clogging of pores, and the potential for bacteria to be trapped inside (Williams et al., 2012). Whereas childhood acne tends to be comedonal, stemming from clogged pores, adolescent acne often reflects an inflammatory response to bacteria inside the follicles and more often features redness, swelling, and pustules (Williams et al., 2012). Acne often appears in visible areas, including the face, neck, chest, and back (Williams et al., 2012). Acne, especially inflammatory acne, typically declines across adulthood (Williams et al., 2012), though it may persist or emerge well after adolescence, particularly among females, and especially during menstruation and pregnancy (Dreno, Bagatin, Blume-Peytavi, Rocha, & Gollnick, 2018).

Puberty researchers have long recognized the emergence of skin changes, including acne, as a marker of pubertal development, yet research on acne and its psychological effects remains limited to the field of dermatology. Indeed, the Pubertal Development Scale (Petersen, Crockett, Richards, & Boxer, 1988), a popular assessment of development in puberty, includes skin change as one of five items. However, puberty researchers have typically aggregated this item with those measuring other bodily changes (e.g., growth spurt, voice change, breast change), making it difficult to detect the unique effects of acne on adolescent development, even though acne is unique in its valence and visibility. Other puberty-related changes, such as breast development and growth spurts, may be perceived as favorable or even attractive depending on the culturally prescribed standard of beauty, but acne deviates from the universal ideal of perfect skin and is generally viewed as unsightly (Magin, Adams, Heading, & Pond, 2011). Likewise, other puberty-related changes, such as pubic hair and menarche, are covert, whereas acne, especially facial acne, is overt and noticeable. The need to disaggregate the psychological implications of acne from those

associated with broader pubertal development is supported by the undesirability of acne in concert with its high social visibility (Magin et al., 2011) during a period of development when the sense of self is heavily influenced by physical appearance (Harter, 2012).

### ACNE AND MENTAL HEALTH

An emerging body of literature indicates that acne is far more than a cosmetic inconvenience, with significant contributions to psychological maladjustment. Studies using data from community samples of adolescents demonstrate links between acne and symptoms of depression (Dalgard, Gieler, Holm, Bjertness, & Hauser, 2008), anxiety (Purvis et al., 2006), and suicidal ideation and attempts (Halvorsen et al., 2011; Purvis et al., 2006). A recent meta-analysis concluded that acne is associated with clinical levels of depression and anxiety, with effect sizes of 0.22 and 0.25, respectively (Samuels, Rosenthal, Chaudhari, & Natsuaki, 2020). Moreover, when including only adolescents in the meta-analysis (most of whom were recruited in the community as opposed to clinical settings), the effect size remained significant for depression ( $r = 0.11$ ) and marginally significant for anxiety ( $r = 0.10$ ). Although these effect sizes seem small compared to Cohen's standards, they are equivalent to the efficacy of antihistamines in controlling allergy symptoms (Funder & Ozer, 2019). Indeed, the psychological burden of acne is estimated to be on par with other serious illnesses, such as diabetes and epilepsy (Mallon et al., 1999). However, psychological science broadly, and developmental science in particular, continue to neglect acne as an important influence on youth's mental health.

### Mediating Mechanisms

Most research on acne and psychological health, including the work reviewed here, remains descriptive, correlational, and cross-sectional, typically localized in dermatological rather than psychological venues. Thus, mechanisms undergirding how acne undermines psychological health await empirical evaluation. That said, both theory and research suggest that self-esteem may mediate apparent relations between acne and psychological maladjustment for at least two reasons. First, acne is culturally defined as a deviation from the ideal of smooth, unblemished skin (Magin et al., 2011). Second, acne tends to escalate during adolescence, when physical appearance takes on heightened significance for youth's self-worth (Harter, 2012). Indeed, research suggests that acne can damage adolescents' self-esteem (Dalgard et al., 2008), which, in turn, contributes to internalizing psychopathology (Nolen-Hoeksema & Girgus, 1994).

In addition to acne's effects on self-esteem, the visibility of acne opens a social pathway through which acne may affect youth's mental health. When shown a headshot of a teenager with facial acne, 65% of adolescents listed the skin as the first

feature that caught their attention, but only 14% of youth did so when shown a photo of a clear-skinned teenager (Ritvo, Del Rosso, Stillman, & La Riche, 2011). Moreover, these adolescents attributed more undesirable psychological characteristics (e.g., nerdy, stressed, lonely) to images of youth with acne than to images of unblemished youth (Ritvo et al., 2011). Consistent with these findings, adolescents with acne are stigmatized and judged harshly by others, including being teased, taunted, and bullied by peers (Magin, Adams, Heading, Pond, & Smith, 2008). Qualitative interviews with adolescents with acne have revealed many negative messages they received from peers about their physical attributes, including being called "pizza face" or "crater face" (Magin et al., 2008). These encounters may affect broader peer relationships since youth with acne report significant difficulties forming friendships, finding dates and sexual partners, and feeling connected to friends and school (Halvorsen et al., 2011; Ritvo et al., 2011). In turn, a robust body of evidence demonstrates strong relations between compromised peer relationships and adolescents' internalizing psychopathology (Burt, Obradović, Long, & Masten, 2008).

### HEALTH DISPARITIES

Acne affects all sociodemographic groups, and available treatment protocols are fairly homogenous across groups (Bhate & Williams, 2013), with the exception of sex-specific acne treatments, such as biological contraceptives to treat female acne (Dreno et al., 2018). Although acne is experienced as undesirable in all groups, the *psychological* impact of acne appears to affect females more strongly than males, and these negative effects may be similarly elevated among youth with darker skin. These disproportionate effects may be further magnified for youth with darker skin as a result of enduring disparities in health care systems affecting ethnic-racial minority groups in the United States (Bisgaier & Rhodes, 2011); individuals in these groups are more likely to have darker skin and experience economic and other stressors than individuals in other groups (Monk, 2015).

#### Gender

Accumulating evidence indicates that females are more psychologically affected by acne than males (Hassan et al., 2009; Smithard et al., 2001; Tan et al., 2008). Although females' heightened psychological response to acne may reflect the increased prevalence of acne risk factors among females (e.g., earlier pubertal onset, menstrual cycle, comedogenic cosmetics that may clog skin pores; Dreno et al., 2018), data comparing females to males point to larger negative effects of acne on females' self-concept and social status (Hassan et al., 2009; Smithard et al., 2001; Tan et al., 2008). Aesthetic ideals of clear and unblemished skin are held by both sexes (Magin et al., 2011), but females experience greater social pressure to attain these ideals than males (Samson, Fink, & Matts, 2010); females

also experience greater psychological distress when they inevitably fail to meet these ideals (Magin et al., 2011).

Consistent with these patterns, in one study, female acne patients expressed greater concern about their appearance than male acne patients, even though reports of physical discomfort or pain caused by acne did not differ significantly by gender (Hassan et al., 2009). Even more striking, in a study of adolescent and adult acne patients, males reported more severe bouts of acne than females, but females still reported more severe acne-specific negative effects on quality of life than males (Tan et al., 2008). These findings show that the psychological effects of acne, rather than physical dysfunction from the disease, are magnified among females.

#### Skin Color

We are unaware of any community-based studies that have directly examined the relative prevalence or impact of acne across ethnic-racial groups, let alone across groups based on skin color, especially in adolescence. Indeed, evidence is muddled by the tendency to use participants' ethnicity/race as a proxy indicator of skin color. Evidence is also clouded by overreliance on clinical samples despite pronounced disparities in access to health care, especially specialty care such as dermatology services, across ethnic-racial and economic groups (Taylor et al., 2002).

Although acne occurs in all ethnic-racial groups (Bhate & Williams, 2013), individuals with darker skin may have unique risk factors that aggravate acne conditions. First, postinflammatory skin damage, including acne scarring and hyperpigmentation, tends to be more severe among individuals with darker skin (Callender et al., 2014; Taylor et al., 2002). Second, some irritants that cause follicular congestion and aggravate postinflammation skin damage (e.g., hair pomade, oil-based moisturizers; Taylor et al., 2002) are used more frequently by Black and Hispanic individuals, who tend to have darker skin (Davis & Callender, 2010; Halder & Nootheti, 2003). Third, in the United States, individuals with darker skin are overrepresented among ethnic-racial minority groups, and these groups are disproportionately affected by economic and occupational barriers to high-quality health care (Fiscella & Sanders, 2016), particularly dermatological and other specialty services (Tripathi, Knusel, Ezaldein, Scott, & Bordeaux, 2018).

Ethnic-racial minority status is associated with many social disadvantages in the United States, including racism, poverty, geographic and residential segregation, and language barriers, all of which are linked to limited access to affordable, high-quality health care (Fiscella & Sanders, 2016). One example of the association among these correlates of systemic inequalities is that ethnic-racial minority groups are more likely to rely on public insurance (Buchmueller, Levinson, Levy, & Wolfe, 2016), which is a well-documented barrier to specialty care, including dermatological treatment (Tripathi et al., 2018). Indeed, in one study, only 29% of dermatology clinics agreed to

schedule a first appointment for a child with public insurance, whereas 96% of the clinics offered an appointment for a child with private insurance (Bisgaier & Rhodes, 2011).

Likewise, compared to non-Hispanic White patients, Hispanic and Black patients are less likely to receive outpatient care for their dermatologic condition (Tripathi et al., 2018), and acne patients who are Black are less likely to be prescribed systemic acne therapies (Barbieri, Shin, Wang, Margolis, & Takeshita, 2020). Geographical disparities in provider access may further compound this issue. For example, in the United States, individuals living in counties with lower median income levels and with high concentrations of African Americans, Hispanic Americans, and Native Americans, as well as in counties in rural areas, have disproportionately limited access to dermatologists (Vaidya, Zubritsky, Alikhan, & Housholder, 2018). Even when dermatologic care is available, dermatologists are less well-trained in assessing and treating skin problems in patients with darker skin (Rabin, 2020).

We know little about the psychological effects of acne as a function of skin color, especially in adolescents. In studies of adults, acne-related concerns and worry appear to differ across ethnic-racial groups, with lesion clearance of the greatest concern for White females and postinflammatory hyperpigmentation most worrisome for non-White females (Callender et al., 2014; Gorelick et al., 2015). That said, it remains unclear if and how skin color (or ethnicity/race as a proxy) may moderate relations between acne and psychological maladjustment. Moreover, these relations may vary as a function of intersections between gender and skin color, as well as across countries. For example, in one study of female acne patients in the United States, acne affected quality of life and internalizing symptoms in comparable ways among White and non-White females (Callender et al., 2014). However, in another study, patients who identified as Asian/other were more likely to report that acne caused feelings of embarrassment, self-consciousness, and unattractiveness than their Black counterparts, and were more worried about potential social difficulties caused by acne than their White counterparts (Gorelick et al., 2015). These and other studies suggest that our knowledge of how adolescents perceive, experience, and cope with acne as a function of their skin color is sorely lacking.

#### DIRECTIONS FOR RESEARCH AND PRACTICE

Developmental scientists should capitalize on acne research as a powerful opportunity to mitigate psychological maladjustment in adolescence and beyond. Puberty researchers already have access to at least some data on acne and other skin changes that could begin to illuminate this novel terrain. Interdisciplinary research efforts that cut across psychology, dermatology, and sociology are especially well-positioned to advance our understanding of acne and its effects across sociodemographic groups and to translate that knowledge into practical recommendations

for health care policy and practice. However, in all these efforts, a developmental perspective is essential for several reasons.

First, it is crucial to clarify the directionality of influence between acne and adolescent mental health. Most psychological research on adolescent acne is cross-sectional (e.g., Dalgard et al., 2008; Halvorsen et al., 2011; Purvis et al., 2006; Smithard et al., 2001). However, some evidence indicates that stress and distress may cause acne breakouts (Chiu, Chon, & Kimball, 2003), introducing the possibility of bidirectional relations between acne and mental health. The need for rigorous longitudinal research designs to elucidate directional relations between acne and mental health is magnified by the potential for these findings to inform clinical guidelines for acne treatment.

For example, isotretinoin (branded as Accutane) is currently the most effective treatment for severe acne. However, its black-box restrictive regulation due to concerns about increased risks of depression, anxiety, and suicidality results in undertreatment of severe acne (Maloney & Stone, 2011). Despite these warnings, the true nature of associations between isotretinoin treatment for acne and mental illness is heavily debated in dermatology, with a recent meta-analysis finding no support for the association between isotretinoin use and mental health problems (Huang & Cheng, 2017). The purported risks of isotretinoin for depression and suicidality hinge on the contested assumption that the medication (rather than acne itself) fuels symptoms of depression and anxiety, both of which are strongly associated with suicide. Thus, we need developmental research designs that test causal pathways between acne and psychological maladjustment, as well as underlying mechanisms and populations at elevated risk. These can raise the awareness of physicians and mental health practitioners to the psychological impact of adolescent acne and shed light on current public health debates regarding options for treatment.

Second, developmental scientists are uniquely equipped to evaluate *mechanisms* by which acne gets under the skin to influence mental health outcomes. Process-oriented research designs can identify psychosocial mediators, such as self-esteem and peer relationships, that can be modified to block the acne-mental health pathway. As a dermatologic condition, acne may not always be controllable, but developmentally informed interventions can mitigate its deleterious effects on mental health.

Third, psychological research on acne within and across groups defined by gender and skin color has just begun. The limited research has evaluated gender and ethnicity/race across discrete categories, but developmental scientists recognize that these are highly packaged and intersecting constructs (Garcia Coll et al., 1996; Spencer, 2006). For example, gender encompasses differential notions and valuations of beauty ideals. Likewise, membership in an ethnic-racial group is correlated with skin color, economic status, exposure to stress, and access to health care (Fiscella & Sanders, 2016). Research is needed to understand the unique and interactive influences of gender and

skin color on the expression and impact of adolescent acne as related to cultural standards of beauty, health behaviors, and structural systems of inequality that eventuate in economic disparities and differential access to high-quality health care. In particular, given relations between skin pigment and postinflammatory scarring and hyperpigmentation (Callender et al., 2014; Gorelick et al., 2015), we encourage developmental researchers to move beyond ethnic-racial self-identification and incorporate dermatologic assessments of skin color using chromameter readings (Gravlee, Dressler, & Bernard, 2005). Chromameter instruments offer objective, quantifiable properties of skin color and are used widely in dermatologic and cosmetic laboratories and clinics. We also encourage developmental researchers to collect data on known derivatives of gender and skin color, such as beauty ideals (and pressures to conform); economic status; and health care insurance, access, and quality. As noted earlier, these efforts must extend beyond the research setting to influence practice, given ongoing concerns about the limited training of dermatologists treating patients with darker skin (Rabin, 2020).

Fourth, we encourage developmental researchers to reposition acne as a unique pubertal event that warrants explicit empirical consideration and nuanced assessments. As noted earlier, acne is distinct from other pubertal changes, such as growth in pubic hair and height, because of its marked social visibility amid uniformly negative evaluations from both the self and others. Efforts to understand youth's experiences and perceptions of pubertal maturation require consideration of each pubertal facet individually, particularly given differential meanings ascribed to these changes based on gender, age, skin color, and culture. For example, regarding voice changes, early deepening of the voice is positively related to self-esteem in African American boys, but not in Caribbean Black boys (Carter, Seaton, & Blazek, 2020). The psychological experience of acne may also vary based on gender, skin color, age, or cultural group membership. We especially encourage an interdisciplinary, multimodal approach to assess acne that includes subjective and objective ratings; clinical acne assessments of lesion counts, locations, and severity; and measures of cyclical and menstrual flare-up patterns. Many of these methods are widely used in dermatology research and could supplant the single-item skin change measures that dominate psychological research. Centering acne as a unique feature of pubertal maturation and using an interdisciplinary approach to investigate it will deepen our understanding of how youth experience and navigate adolescence.

Finally, while we have focused here on dermatological studies of acne, the applied significance of developmentally informed research on adolescent acne and mental health extends well beyond dermatologists' offices. Parents, teachers, school counselors or nurses, and pediatricians have important roles to play to help adolescents navigate and mitigate the psychological and social tolls of acne. Many adolescents, especially those with mild acne or without health insurance, may not seek help from

dermatologists but may express concern to a primary care provider or seek nonmedical support from friends, parents, or mentors.

## CONCLUSION

Acne, mental health, and their interactions occur at the intersection of biological, developmental, and cultural influences on development and adaptation. Moreover, gender, skin color, and health care disparities (particularly in the United States) shape the psychological impacts of adolescent acne. Developmental scientists have the opportunity to provide essential and innovative insights into the heretofore underappreciated relations between acne and adolescent psychological health, particularly among females and youth with darker skin. The task is large, but we can start by adopting an interdisciplinary research approach to address the following question: When, how, and for whom does acne eventuate in psychological maladjustment?

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