ity disorder or of the sample taken as a whole. In these two analyses, parental brutality (physical aggression and violence) was the factor most strongly associated with overall outcome.

In any case, both of these studies point out the importance of substance abuse in the course and outcome of borderline personality disorder. We hope that this information leads to clinicians paying close attention to this often overlooked set of co-occurring disorders.

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Which Image for Lorenz?

TO THE EDITOR: The *Journal*'s photo of Konrad Lorenz with the geese who behaved toward him as if he were their mother (1) is charming indeed, but Lorenz's politics were anything but charming. Because those politics were unknown to the author, Francine M. Benes, M.D., Ph.D. (who was horrified to learn of them), I call those views to the attention of readers.

Lorenz was explicit in his defense of Nazi concepts of racial purity (2). He wrote in 1940 that

> the only resistance which mankind of healthy stock…can offer against being penetrated by degeneracy is based on the existence of certain innate schemata.…Our species-specific sensitivity to the beauty and ugliness of members of our species is intimately connected with the symptoms of degeneration caused by domestication, which threaten our race.…Decadent art provides many examples of such a change of signs.…The immensely high reproduction rate in the moral imbecile has long been established.…This phenomenon leads everywhere to the fact that socially inferior human material is enabled…to penetrate and finally to annihilate healthy stock. This selection for toughness, heroism, and social utility…must be accomplished by some human institution, if mankind, in default of selective factors, is not to be ruined by domestication-induced degeneracy. The racial idea as the basis of our state has already accomplished much in this respect. (3, p. 2)

Lorenz justified Nazi legal restrictions against intermarriage with non-Aryans as a social measure to correct for "domestication-induced degeneracy." After the war, Lorenz no longer referred to his 1940 article, but his Nazi past should never be forgotten—notwithstanding his Nobel Prize.

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Dr. Benes Replies

TO THE EDITOR: Dr. Eisenberg is appropriately concerned about the article describing Konrad Lorenz's seminal observations regarding the critical periods for the development of imprinting. Having knowledge of Lorenz's political views, Dr. Eisenberg felt obliged to inform the readership that Lorenz had embraced horrific ideas regarding racial prejudice.

It is clear, based on his work on imprinting, that Lorenz was capable of thinking in a logical and reality-based manner. But having the capability of thinking logically as a scientist does not necessarily ensure that one will arrive at moral conclusions. Beginning a syllogistic process with premises that were prejudicial in nature lead Lorenz to a tragically false conclusion. Dr. Eisenberg's letter underscores the fact that scientific prowess can be associated with grotesquely misguided sociopolitical views. It is a sad fact that being a scientist, even a Nobel laureate like Lorenz, does not ensure that logic will prevail over prejudice.

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Behavioral Effects of Childhood Malnutrition

TO THE EDITOR: We read with interest the recent article by Jianghong Liu, Ph.D., et al. (1). For the past 35 years, we have been studying behavioral outcomes of Barbadian children with histories of protein-energy malnutrition or kwashiorkor in their first year of life and a healthy comparison group, classmates of the index children (2). The children had adequate birth weights and no repeat episodes of malnutrition and were followed by the National Nutrition Centre through age 11. The children were assessed extensively through age 18 and are now being reexamined by us at 32–37 years of age. Using both teacher and parent behavior checklists at several ages, we documented attentional deficits in 60% of the children with histories of malnutrition versus 15% of the comparison group, lasting at least until age 18 (3–5). Other behaviors reported by us that were associated with infantile malnutrition included increased aggressive behavior at ages 9–15 (4) and poor socialization at ages 5–11 (3).

Our concern with the study by Liu and colleagues is that it did not distinguish between the effects of chronic and acute malnutrition, the timing of the malnutrition, or the different forms of childhood malnutrition. Nutritional status was documented only at age 3; medical care before and after this age was not analyzed. It is well known that malnutrition during critical periods of brain development (from the second trimester of pregnancy to age 2) is associated with permanent deficits in brain and behavioral function, whereas malnutrition experienced after this period does not produce permanent deficits (6). Moreover, the authors were unable to eliminate the presence of continuing health and nutritional problems after age 3 as contributing to the observed behaviors. The definition of malnutrition used in this study is very unconventional. Heights and weights, standard measures of nutritional status, were not included despite a prior article by these authors that included heights and weights (7). Especially confusing is that the taller and heavier children (who were therefore presumably not malnourished) in their earlier study showed more aggression, conflicting with findings in the current study of more aggression in "malnourished" children. Finally, the term "dose-response,"

ordinarily used to describe quantitative differences on a single construct when the authors actually meant one or more comorbid conditions, was misleading.

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Dr. Liu and Colleagues Reply

TO THE EDITOR: We appreciate the thoughtful comments of Dr. Galler et al. regarding our recent work on malnutrition and externalizing behavior problems. They point out that we did not test for the effects of acute versus chronic malnutrition on long-term behavior, that we measured malnutrition at only one time point, and that the effect of malnutrition may be prenatal rather than postnatal. In response, we refer the reader to the limitations section of our article, where we acknowledged all of these issues. The important study of Neugebauer et al. (1), demonstrating a link between prenatal malnutrition and, later, antisocial personality disorder, clearly demonstrates the significance of prenatal nutrition on later externalizing behavior. Our research took this further by demonstrating that malnutrition assessed at age 3 years has long-term effects on children's externalizing behavior (aggression, hyperactivity, and conduct disorder) across 14 years, as assessed at three age points. We believe our study is the first to demonstrate a link between malnutrition assessed postnatally and later externalizing behavior. Furthermore, although malnutrition was not assessed after age 3, the important practical and intervention implication is that the children who showed external, observable signs of malnutrition at age 3 are at risk for developing externalizing behavior. If we assume that this link is causal, better nutrition postnatally could help prevent such problems. In support of this, we recently demonstrated that a multimodal postnatal enrichment that included better nutrition significantly reduced conduct disorder at age 17 and criminal behavior at age 23 (2), and furthermore, these beneficial effects on conduct disorder were potentiated in children with signs of malnutrition at entry into the prevention program. This finding and work on the effects of nutritional supplements in reducing antisocial/aggressive behavior in prisoners (3) are not consistent with the claim of Dr. Galler et al. that the negative effects of prenatal malnutrition are permanent and instead suggests that whether prenatal or postnatal, the deleterious effects of early malnutrition can be addressed. We fully agree that future studies that elucidate the relative roles of prenatal and postnatal malnutrition in the development of children's externalizing behavior are important.

Dr. Galler et al. suggest that our definition of malnutrition was unconventional and that height and weight were not used. In response, there are at least two types of malnutrition: macromalnutrition, which often refers to protein-energy malnutrition, and micromalnutrition, which usually refers to mineral and vitamin deficiency (e.g., zinc, iron, vitamin A). Although assessment of the former often includes height and weight, the latter can be assessed by signs and symptoms in addition to laboratory measurements. In our article, we emphasized that the indicators of malnutrition reflect deficits not only of protein (red hair, sparse/thin hair) but also of iron (low hemoglobin level) and zinc (red hair, sparse/thin hair). A deficiency in iron and zinc could negatively affect brain growth and development and result in antisocial behavior. In our study, anemia indicated by a low hemoglobin level, which reflects iron deficiency, was the most common indicator of malnutrition; this cannot be viewed as an unconventional measure. Furthermore, unlike the indicators we used, height and weight are strongly influenced by genetic factors unrelated to malnutrition. The fact that we previously found that children at age 3 who are taller and weigh more (hypothesized to reflect increased testosterone and/or a physical advantage that predisposes to aggression through social learning) illustrates both the importance of recognizing different forms of malnutrition and also the fact that multiple etiological factors are at play in shaping externalizing behavior (Raine et al., 1998, reference 6 from previous letter).

Finally, Dr. Galler et al. felt that our use of the term "dose-response" was misleading. The empirical fact remains that the more indicators of the single construct of malnutrition that a child has, the greater the level of later externalizing behavior.

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