Invited Commentary

# Childhood Self-Perceptions in Children With Amblyopia
## Is the Problem the Disease or the Treatment?

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**The study by Birch et al**[1] in this issue of *JAMA Ophthalmology* provides us with an informative perspective on the lives of children who were treated for amblyopia. These investigators studied 50 children who received treatment for amblyopia who were approximately age 10 years who wore eyeglasses, 31 (62%) of whom had been treated for strabismus, including surgically, and in whom the median stereopsis was nil. The children with amblyopia were compared with 13 similarly aged patients with anisometropia or strabismus who mostly wore eyeglasses but did not have amblyopia and had moderately impaired mean stereopsis of 200 arcseconds. A final group was visually healthy children, none of whom wore eyeglasses and who had a mean stereopsis of 40 to 50 arc-seconds, representing the best possible performance on this test.

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Birch et al primarily studied the self-perception of these children as measured using a subjective 4-point scale in several domains. This psychological evaluation demonstrated that children with amblyopia, on average, reported feeling less scholastically competent than their peers. Moreover, children with amblyopia and children with nonamblyopic visual disorders felt less socially and athletically competent. While there were no differences in self-perception on average among the groups in physical appearance or behavioral conduct, there was a trend in these domains toward lower self-perception in the children with amblyopia on average, but this was not statistically significantly different. We therefore cannot be sure that the children with amblyopia did not also feel less socially and athletically competent than their peers.

Birch et al provided objective validation that suggests that the perceptions of these children with amblyopia reasonably reflect reality in many regards. The diminished perception of social, athletic, and scholastic competence corresponded with direct measurements that showed a lower performance in aiming and catching tasks in children with amblyopia. Most interestingly, lower perceived scholastic competence was associated with a lower reading speed. There was no association between perceived competence and manual dexterity or balance tests, in which binocular vision would not be expected to play a decisive role.

Birch et al found no association between self-perception and amblyopic eye visual acuity or stereopsis. However, the failure to demonstrate such an association is not evidence of the real absence of one, given the narrow range of visual acuities in the treated amblyopic eye and the observation that at least half of the patients with amblyopia had nil stereopsis that was out of range of the test altogether. Linear associations with variables at the extreme ends of any range, and indeed out of the range, become largely meaningless as the underlying mathematical assumptions are invalid under these conditions.

What shall we conclude from this study? The authors are correct that the lives of some children are affected by amblyopia. This study extends the work that Birch and several of her collaborators have performed on the association of amblyopia with reading speed, consistently showing an approximately 12% reduction in reading speed in children with amblyopia compared with controls.[2,3] Amblyopia also slows the completion of multiple-choice examination forms.[4] This study also demonstrates the deficits in aiming and catching performance in children with amblyopia, which is understandable in light of their reduced stereopsis.

The authors would have us conclude that most or all of these deficits are specifically associated with amblyopia. However, this conclusion should cautiously approached because the effects of amblyopia may be associated with the causes and treatments of amblyopia rather than or in addition to the underlying disease itself. A recent systematic review stated, "It seems that the main HRQoL (health-related quality of life) implications of amblyopia appear to be related to treatment of the condition rather than to the condition itself."[5] For example, amblyopia is commonly caused by or associated with refractive errors, such as high ametropia, anisometropia, and astigmatism, for which eyeglass treatment is required. Children with amblyopia will in most cases have undergone occlusion therapy at some point during their early childhood years, a potentially traumatic experience that is likely to have lasting lifelong psychological effects. Amblyopia treatment, with eyeglasses and sometimes patches, may provoke stigmatization, being bullied by peers, and bullying of child patients,[5,6] although the psychological burden on child and parent may be less with atropine treatment.[7] Finally, as this and many other studies have demonstrated, amblyopia is nearly always associated with an impairment in stereopsis,[8] frequently to a severe degree, as was the case in at least half of the children with amblyopia in this study. Statistical correlations of only small intragroup variations at the extreme ends of the measurement range are probably not reliable for distinguishing the contributory effects of these highly associated factors. Ultimately, our inability to distinguish the effects of amblyopia from its causes is unimportant for clinical purposes, in which currently the treatments are the same.

What should be gathered from this study by ophthalmologists and their colleagues? As Birch et al concluded, we do not yet know if the treatment of amblyopia will improve self-perception or the measures of objective performance, including reading speed, aiming, and catching. It is possible that treating amblyopia is helpful, an attractive idea when a child's profound amblyopia is improved to the range of mild amblyopia. However, it is also possible that some of the adverse psychosocial effects of treatment[5,6] may outweigh the func-

tional benefits of amblyopia, because when prolonged, full-time occlusion fails to achieve any visual improvement in a child with dense deprivation amblyopia. Finally, it is still possible that treating amblyopia makes no difference at all for some of the performance variables that were studied. It will be important, albeit difficult, to determine the actual effects of treatment in everyday life and their association with patients' self-perceptions and happiness.

Until more is known about the foregoing question, it remains our obligation as ophthalmic physicians and health care clinicians to detect, monitor, and treat amblyopia. However, we must also consider the social and self-esteem burdens not only of amblyopia, but of amblyopia therapy itself. This may argue for a careful balancing of the family and psychosocial burdens of treatments, such as patching, against the likely improvements that can be obtained by prolonging such treatments. It may be the case that after some improvement has been attained with amblyopia therapy, that there could be a point of diminishing or even reversing returns on continuing or intensifying therapy. These questions deserve further study because amblyopia remains the largest threat to vision among children and it is a major cause of visual loss among patients of all ages. Birch et al are to be commended and encouraged for their work in this vital area.

## ARTICLE INFORMATION

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