subjects at baseline (mean=2.66, SD=0.49) and after treat-
ment (mean=2.56, SD=0.51) resulted in t=0.37, df=12, p=0.72,
with a 95% confidence interval of –0.48 to 0.68.

Our current clinical observation cautions us that atomox-
etine may also be of limited value in children who do not re-

come to respond with standard stimulant therapy. The role
of atomoxetine needs to be firmly established with a cost-
effective analysis if it is to be considered as first-line therapy,
and its effectiveness in nonresponders should be demon-
strated if it is to be considered for an expensive trial among
nonresponders to first-line stimulants.

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Autism, Movement, and Facial Processing

TO THE EDITOR: Ami Klin, Ph.D., et al. (1) showed that a high-
functioning autistic adult looked at mouths rather than at the
eyes of adults’ faces when viewing naturalistic social situa-
tions, while a normal comparison adult showed the opposite
pattern. According to this argument and others, the authors
argued that low orientation to salient social cues embedded
in naturalistic situations is a core deficit in autism.

In their Letter to the Editor, Chantal Kemner, Ph.D., and
Herman van Engeland, Ph.D., M.D. (2), wrote that when autis-
tic children are shown a static presentation of faces, they do
not reach the conclusion of Dr. Klin et al. They argued that the
discrepancy between these results is due to a difference in the
presentation of facial stimuli, i.e., the dynamic presentation
in the study of Dr. Klin et al. versus the static presentation in
their own study.

We confirm that low-functioning autistic children are im-
paired in the processing of physical environmental move-
ment, particularly rapid movement (3), while high-function-
ing autistic children are much less impaired in the same type
of tasks. When biological movement is concerned, autistic
children perform relatively adequately in emotional and non-
emotional expression-recognition tasks when facial expres-
sions are displayed slowly on video (4). Along the same line,
low-functioning autistic children better recognize dynamic
facial expressions when displayed slowly than when pre-

sented at normal speed. Considering these arguments and
others, we proposed the rapid visual-motion integration defi-
cit hypothesis in autism (5). According to this hypothesis,
some autistic individuals having major movement-processing
disorders from early in their lives will avoid rapid physical
and biological movements (considered as aversive stimuli),
thus disrupting secondarily social interaction. Some of these
individuals, or some autistic persons having minor motion-
processing disorders, will search for, habituate themselves to,
and learn to handle and cope with such kinds of stimuli. To
summarize, rapid visual-motion processing deficits consti-
tute a core neuropsychological marker of autism and second-
arily account for the deficit in social interaction.

Thus, when the autistic subject focuses on the mouths of
adults’ faces in the study by Dr. Klin et al., he or she probably
attempts to capture facial speech information that is difficult
to process accurately and efficiently in naturalistic social situ-
ations while avoiding looking at the fastest facial movements
(i.e., saccadic eye movements).

Therefore, discrepancies between the results of Dr. Klin et
al. and of Drs. Kemner and van Engeland might be due to the
severity of autism in the subjects tested in their respective
studies and to the kind of presentation of facial stimuli.

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Dr. Klin and Colleagues Reply

TO THE EDITOR: We thank Dr. Gepner for his letter concerning
our article and the letter of Drs. Kemner and van Engeland
discussing their findings (1) relative to ours. A word of accu-

racy, however, needs to precede our reply. Drs. Kemner and
van Engeland were not reacting to our review in the Journal
(that included a single case illustration) but to our case-con-

trol series, which appeared in the Archives of General Psychia-
try (2). And it was our suggestion (3), not that of Drs. Kemner
and van Engeland, that the discrepancy in results between the

two studies could be due to the type of stimuli used in the two

studies: static, i.e., pictures, by Dr. Kemner and her colleagues
(1) versus dynamic, i.e., videotaped social situations by us (2).

Dr. Gepner’s hypothesis of a rapid visual-motion integra-
tion deficit in autism is interesting, but we must take issue
with his explanations of our data. First, Dr. Gepner hypothe-

sizes that some individuals with autism may avoid rapid
physical and biological movements (considered as aversive
stimuli), which would, developmentally, disrupt social inter-
action. In our clinical experience, young children with autism
may in fact be fascinated with rapid movements, particularly
if these are repetitive or create unusual sensory sensations
(e.g., shining reflections as in spin-top or repetitive patterns
like in a computer screensaver). As in many areas of percep-
tual research in autism in which a basic process was proposed
to underlie more global visual attention to social stimuli, we
feel that it is important to study the given process in both nonsocial and social paradigms so as to ensure that the deficit is general rather than a phenomenon that occurs only in social situations.

Second, Dr. Gepner hypothesizes that our finding of increased visual fixation on the mouth region (rather than the eyes) of people in our videotaped stimuli reflects the participants’ attempt to capture information that is difficult to process accurately and efficiently in naturalistic social situations. In other words, individuals with autism would focus on the mouth because they were overwhelmed by the rapid movement nature of naturalistic social phenomena. While this is a possibility, we doubt that this is the only factor accounting for our results. For example, in some of our eye-tracking illustrations (e.g., Figure 3 in our article, p. 900), there is hardly any movement taking place. In addition, our eye-tracking studies of toddlers with autism (4) showed that young children with autism also focus a great deal on mouths, and in our video stimuli of a parent’s approach to a toddler, the mouth region is where most of the movement is taking place (because the caregivers are continuously talking).

Third, Dr. Gepner’s own work (his references 3–5) suggests that lower-functioning individuals with autism (i.e., those with a degree of mental retardation) are impaired in the processing of physical environmental movement, particularly rapid movement, while higher functioning individuals with autism (i.e., those without accompanying mental retardation) are less impaired in such tasks. In other words, low-functioning children do worse than high-functioning children on visual tasks involving rapid movement. Applying this notion to the discussion of our results and those of van der Geest and colleagues, Dr. Gepner hypothesizes that the discrepancy may be due to the severity of individuals with autism included in the two studies, with our participants being more cognitively disabled than those included in the study by van der Geest and colleagues. Inspection of subject characterization data on the two studies does not support this hypothesis. The participants in our study were both older and more cognitively able than the group of participants in the study by van der Geest and colleagues. In fact, the viewer with autism might be called “mystical” or marked by visions, “revelations,” or losing the sense of oneself.

Religion, Spirituality, and Mysticism

To the Editor: In regard to the article by Jacqueline Borg, Psychol., M.Sc., et al. (1), we were intrigued by the potential association between the serotonin system and the character trait of “self-transcendence.” However, we urge caution in interpreting these results as evidence of a biological basis for religion/spirituality. A careful definition of terms is required to avoid confusion.

“Spirituality” is a relatively new term that refers to the nearly universal human search for meaning, often involving some sense of transcendence. Some suggest that spirituality is a broader concept than religion and is therefore more appropriate for pluralistic contexts (2). However, it is not clear that spirituality actually describes a more universal phenomenon (3). In fact, the concrete and individualized manifestations of “spiritualities” tend to function not as universals but precisely the opposite: unique religions with only one member (4).

On the other hand, “religion” refers to a particular tradition, practice, or community that shapes a comprehensive worldview sufficient to interpret all of human experience within a specific cultural context (3). Within any religious tradition such as Catholicism, there are many practices that may be considered faithful and normative, such as Benedictine monasticism, “third-order” Franciscan spirituality, or the prayer of the Rosary. Of all the practices of spirituality, a small subset might be called “mystical” or marked by visions, “revelations,” or losing the sense of oneself.

Although we doubt a direct correspondence, such mystical experiences may appear similar to the auditory and visual hallucinations induced by psychotropic drugs, such as LSD. Some aspect of such mysticism may be mediated by the serotonergic system. However, Dr. Borg et al. used religion and spirituality interchangeably, and they reduced religion/spirituality to mere mystical experience. This reduction is misguided and potentially confusing. Many faithful religious practices have no mystical component, and in fact, several religious traditions specifically reject the type of mystical experience addressed in this article (5).

Therefore, we suggest that the variability in serotonin may not be best understood as a marker for religiousness, per se, but as a marker for a more general character trait found in both religious and nonreligious people. It would be interesting to repeat a similar study within two populations of religious and secular subjects. We suspect that within both populations, a subset might have lower binding potentials that would correlate not only with “spiritual acceptance” but also with the metrics of mystical experience and perhaps recreational drug use. Finally, given the hypothesis that self-transcendence is environmentally influenced by the differences

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