Understanding Visual Literacy: The Visual Thinking Strategies Approach

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Abstract This chapter makes the case for two aspects of visual literacy that the authors believe to be generally overlooked: (1) that visual literacy occurs by way of a developmental trajectory and requires instruction as well as practice, and (2) that it involves as much thought as it does visual awareness and is an integral component of the skills and beliefs related to inquiry. This chapter roots these ideas in the theory and research of cognitive psychologist Abigail Housen, coauthor of *Visual Thinking Strategies* (VTS) with museum educator Philip Yenawine. Housen identified aesthetic stages that mark the development of skills helping to define visual literacy. Her research is also the basis of VTS, a method of engaging learners in deep experiences looking at art and discussing meanings with peers, a process that, this chapter posits, furthers visual literacy. This chapter presents that body of research and details the resulting VTS protocol. It reviews academic studies to date, subsequent to Housen, that document the impact of VTS interventions in various settings, and suggests beneficial areas for future research. In order to probe what development in visual literacy looks and sounds like on a granular level, two case studies of student writing from existing studies are presented and analyzed. Visual literacy skills enabled by VTS are briefly connected to broader educational concerns.

Introduction

In order to produce children who know how to read well enough to perform practical tasks, at the very least, parents and caregivers talk to children as babies, introduce books early on, and prepare them for school, where various step-by-step

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processes are employed to help children achieve functional verbal literacy before the end of elementary education. Not so with visual literacy.

The culture at large seems to assume that somehow, perhaps because of our constant bombardment with images, visual literacy will simply happen without specific instruction. This attitude carries over to formal education, where achievement in reading, writing, and arithmetic sets the agenda, and where leaders are often mystified as to what visual literacy even means, much less how it may contribute to the teaching of skills prioritized by convention and mandate.

Even among the few who bemoan the consequences of a visually illiterate public, a gap exists between concern for the problem and offering solutions based in relevant theory and presented in terms of values common to those who set cultural and educational policy. In fact, as this chapter explores and tries to remedy, in the field of visual literacy there is no fleshed out, generally agreed-upon definition or shared understanding of the skills involved. The wider world therefore has no sense of the relevance of these skills to educational practices that result in success throughout schooling and eventually in adulthood, work, and civic engagement; there is even less understanding of the potency of integrating visual literacy with teaching the "3 R's." Fostering greater understanding in this area is the essential prerequisite for visual literacy to be regarded as the broad-ranging, pertinent, and teachable matter that it is.

This chapter aims to deepen comprehension of visual literacy and how it can be developed through teaching a specific methodology, Visual Thinking Strategies (VTS). The authors' perspective is shaped by long-standing practice as educators using VTS and regularly engaging in close study of VTS interventions. VTS is intended to nurture growth in aesthetic thought (the cognition that takes place as people look at art) as described by cognitive psychologist Abigail Housen, who coauthored the methodology. Beginning with a consideration of the definition of visual literacy, this chapter provides an overview of Housen's theory and research, explains what is meant by aesthetic thought, and how it develops, and connects Housen's insights to the wider field of visual literacy. It further describes in detail the mechanics of the VTS teaching methodology and reviews academic studies on its impact, which in turn are discussed to illuminate how visual literacy develops.

A Developmental Approach to Understanding Visual Literacy

John Debes's (1968) definition of visual literacy—he is credited with coining the term—establishes a clear starting point for understanding visual literacy at its core. He writes:

> Visual Literacy refers to a group of vision-competencies a human being can develop by seeing and at the same time having and integrating other sensory experiences. The development of these competencies is fundamental to normal human learning. When developed, they enable a visually literate person to discriminate and interpret the visible actions,

objects, symbols, natural or man-made, that he encounters in his environment. Through the creative use of these competencies, he is able to communicate with others. Through the appreciative use of these competencies, he is able to comprehend and enjoy the master-works of visual communication. (p. 27)

This definition is one of the broadest in the literature. One of its strengths is the fact that it refers to visual literacy as competencies that "develop." Even though Debes states that they are "fundamental to human learning," these competencies are acquired and enhanced by dint of effort, exposure, and, ideally, guided experience. The intended outcome, for Debes, is fluency: The ability to differentiate among and interpret the things one sees and to appreciate "masterworks of visual communication." He also includes the ability to communicate creatively applying these skills, a topic explored at length below. (The development of visual communication abili-ties—from drawing to design to creating diagrams, graphs, and maps—requires teaching interventions beyond what is addressed here.)

As with any literacy, visual literacy begins with the development of the brain's capacities over time, through both structured experience (i.e., teaching) and ongo-ing, informal interactions with the visual environment. Just as parents and teachers take pains to develop reading literacy, we can and should employ a similar process to ensure visual literacy, ideally by building on existing skills, challenging them appropriately, and structuring the experience to allow children to construct their understandings of what they encounter visually (Bruner 1960). By stepping up at-tention to nurturing visual literacy through teaching methods rooted in research on its developmental and cognitive aspects, all levels of education will benefit (Arn-heim 1969).

But what are the cognitive aspects of vision? While the eye perceives, the mind processes observations, draws meaning from them, and organizes that meaning in connection with an array of current and prior experiences, memories, and ideas as well as such details as the immediate physical context. Though responses to what is observed can materialize in many forms, a primary one is language. The visual cor-tex connects directly to language centers in the brain. The content of the eye–mind connection commonly appears in what people say and may be further facilitated by the act of speaking, an iterative process. Influencing this concurrence of observa-tion, thought, and language (which necessarily includes other senses as well) is crucial to achieving Debes's version of visual literacy and has serious implications for teaching.

In addition to Debes's account, however, there is another powerful way to de-scribe a visually literate person: someone who looks with a questioning state of mind. Importantly, visual literacy involves as much inquiry as it does visual acuity. "Inquiry," write the authors from the National Committee on Science Education Standards and Assessment (Olson and Loucks-Horsley 2000), "is a multifaceted activity that involves making observations; posing questions; examining books and other sources of information to see what is already known in light of experimen-tal evidence; using tools to gather, analyze, and interpret data; proposing answers, explanations, and predictions; and communicating the results." This definition of inquiry, applied broadly in science education, is a useful framework for considering

how developing visual literacy is integral to the cultivation of inquiring minds. As students engage with works of art and with each other in a structured group inquiry process, such as VTS, their visual literacy develops in tandem with a critical pathway into inquiry generally.

Perhaps because of the apparent effortlessness of a child beginning to recognize, categorize, and classify what she sees—Rudolf Arnheim parses this brilliantly in his seminal book, *Visual Thinking* (1969)—society collectively fails to appreciate both the complicated cognition involved in visual literacy and the steps required to ensure it develops. One way to study its presence is through asking people to talk about what they see: by capturing in language the lightning-fast transition of perception to thought to language. Asking people to think out loud, talking about what they see as they look, and recording their comments result in concrete data about the process of visual meaning making. These insights came into focus in the work of Abigail Housen.

Housen is a cognitive psychologist who, along with Yenawine, cocreated the VTS protocol. Her research casts light on both the skills involved in and the developmental arc of visual literacy. She completed her doctorate in 1983 at Harvard's Graduate School of Education alongside a number of scholars interested in how the mind develops. Her specific interest was in how viewers process what they see in art, which she knew from her reading of James Mark Baldwin (1975) and Rudolf Arnheim (1966, 1969), among others, to be a particularly rich and complicated way of thinking. While visual literacy involves visual encounters with both the natural and the human-made world, viewing art, as a particularly complex form of visual stimulus, is, it turns out, an appropriate place to study the range of looking and thinking skills involved in visual literacy. Art usually includes a certain amount of readily recognizable information, but it is intentionally ambiguous and layered with meaning, creating the impetus for searching beyond the obvious over the course of extended, thoughtful examination.

Housen: Research Questions, Methods, and Findings

Housen's work began with a number of key questions: How could looking at art make some uncomfortable, others bored or edgy, and still others animated and excited? What goes on in people's minds as they stand in front of a painting? Why do some individuals stay longer with art—finding more meaning for longer periods—than others? What goes on over their lifetimes as they look again and again at many works of art? (1983, 2007).

Housen's research process and resulting theory is ultimately indebted to the developmental psychologist Jean Piaget (1926, 1951), but is even more directly influenced by the methodologies and findings of Housen's Harvard colleagues, including Lawrence Kohlberg (Kohlberg and Hirsch 1977; Duska and Whelan 1975) and Jane Loevinger (1976, 1993). Michael Parsons (1987), another scholar working at roughly the same time, was also inspired by Kohlberg and posited a stage theory

related to aesthetic development. Though their methods were quite different, Housen's and Parson's findings correspond in many ways. One significant difference concerns the detail with which Housen came to understand the novice viewer, who, as will be discussed below, is the subject of teaching strategies aimed at developing visual literacy.

Beginning in the 1970s, and continuing for almost a decade, Housen interviewed hundreds of individual subjects while they looked at art. She developed a rigorous protocol called the Aesthetic Development Interview (ADI), in which the viewer speaks in an undirected way about what he sees while viewing an artwork. Housen recorded individuals at all levels of viewing experience; she simultaneously collected detailed biographical information on each participant. After transcribing the interviews, she broke the comments into distinct units of thought and studied them, eventually developing a method of categorizing and coding the immense range of thoughts she found (1983).

Housen's analysis of her data is detailed, nuanced, and extensive. Analyzing the interviews thought by thought, she found a total of 13 domains—including observations, preferences, associations, evaluations, negative or positive comprehension, and questioning—which were further broken down into as many as 13 discernible issues or subcategories. All the interviews were coded by way of these domains and categories. She was able to determine that people with different experience in viewing art actually think in different patterns. Like her colleagues, she concluded that these patterns represent distinct sets of behaviors, with little overlap, that occur roughly sequentially. She found five such patterns and refers to them as aesthetic stages. (See Appendix for summaries of all five stages.)

While Piaget noted that developmental changes seemed to occur naturally over time, Housen determined that a specific form of experience—deep looking at art specifically, or what Housen calls "eyes on canvas"—is required to produce aesthetic growth. Movement from one stage to the next comes as a result of extended, thoughtful examination of visually complex material over time. In other words, in the absence of observing and thinking about meaning in complex imagery, growth through the stages does not occur. Notably, it is not until the later stages that growth is usually combined with acquisition of information. Importantly, beginner viewers can be any age. The key factor is experience in looking at art, rather than life experience in general or simple maturation.

Housen's Early Stages: The Pre-Visually Literate

Housen's account of the first two stages (called accountive and constructive viewers) clarifies what it means to be pre-visually literate and sheds the most light on the processes involved in reaching basic visual literacy, which, this chapter argues, occurs at the end of stage 2. She determined, for example, that people in stage 1, who have had little or no contact with art and therefore have no references for it, only apply what they know from their own lives to make sense of what they see. Experts

also apply lived experience but add other ways of thinking that result from their interactions with art over extended periods of time, relying on a variety of strategies as well as specific concepts and information acquired through lengthy effort.

Usefully, Housen found that a particular kind of observation—very simple ones—dominates stage 1. These viewers make random, basic, perhaps one-word observations of things seen piecemeal rather than holistically or systematically. At first, some observations are what Housen describes as "idiosyncratic": clear to the viewer but not necessarily seen by others or intended by the artist. With time spent and experience looking, viewers begin to ground these observations in the logic of the image itself. They see things as connected to other things, in context, and in space. While at first, their observations are concrete—it is a tree, not a picture of a tree—gradually, the notion of images as representations created by someone with specific intentions comes into focus. Similarly, what is recognized early on in an image is based on the personal experience of the viewer making associations: *that looks like* my *house*.

When people in stage 1 begin to make meaning from a set of observations, Housen found, that meaning usually takes the form of short pieces of narrative. For example, a beginner viewer will animate a still image by inferring that a depicted figure is walking or thinking. It is common to assign emotional meanings to what is seen, such as, *he's angry or sad*. An early version of comparing shows up in phrases such as, *this looks like*. As viewers move into stage 2, they begin wondering why something looks as it does, comparing the image to others in their experience. At that point, the standard of reference is usually what the viewer expects based on reality. These viewers often note that discrepancies between what they see and what they expect make something weird. With additional experience viewing and thinking about art, other frames of reference are invoked during stage 2, such as craft (*the way he painted is kind of blotchy*), medium (*this is a black and white photograph*), or time/culture (*I think this is Egyptian*).

Implications for Teaching

The great majority of the thousands of individuals across age groups studied by Housen—her research continued for two decades following the completion of her dissertation—is in the most basic stages of aesthetic development, stages 1 and 2, with most in the former. Despite the plethora of images people encounter daily, they show little advancement in either range or scope of observations habitually made, and little development in terms of thinking. Virtually modifies all of the individuals found in later stages (3 through 5) are directly involved in extensive and self-motivated studying, making, or collecting of art—and they have been doing it for years (Housen 1983, 1999, 2007).

Housen's work prompted some major museums (notably, the Institute for Contemporary Art and the Museum of Fine Arts, both in Boston, and the Museum of Modern Art, New York) to request studies (Housen 1984–1991; Duke and Housen 1998). Sensing that there are gaps in their knowledge or experience, many museum

visitors seek help finding meaning in what they see, and museum education departments are charged with providing the desired assists. Could something be learned from knowing visitors' aesthetic stage? Could the impact of educational offerings be determined—did people learn what was taught in the programs provided?

Three findings from these museum studies are significant to this chapter: (1) the majority of museum visitors were at an early viewing stage and not yet visually literate, in the sense of the skills laid out by Debes (1968), (2) very little of the intended impact of educational offerings could in fact be documented, and (3) to the extent that the effects could be noted, they corresponded to the person's aesthetic stage (Housen 1987, Duke and Housen 1998). Consistently, the information offered and the teaching strategies adopted by museums were operating above the level of most of those who sought help. Their educational efforts failed to stick.

Fortunately, Housen's data analyses provided some major insights into how to redirect teaching, including what to avoid when creating interventions designed to help people see more, think in more complex ways, and find greater meaning and pleasure as result (De Santis and Housen 2007; Yenawine 2013). She and Yenawine—who was the Museum of Modern Art's (MOMA) director of education from 1983 to 1993—set about using these analyses to create teaching methods that actually spurred aesthetic growth among MOMA's visitors. Over the course of a dozen years and several research studies, they created Visual Thinking Strategies (VTS). The process involved many refinements and clarifications; the resulting teaching methodology and an associated elementary-school curriculum were published in 2000 and 2001 (Housen & Yenawine, 2000-2001).

Housen's original research, built upon by subsequent studies designed to document the impact of VTS, shows that the range of processes involved in aesthetic development are not distinct from, but instead are a part of, thinking processes more generally. This finding is now corroborated broadly in neuroscience, where vision itself is understood to be "information processing, not image transmission" (Livingstone 2002). Recent neuroscientific research continues to deepen our understanding of the art experience as particularly rich cognition. For example, Jean-Pierre Changeux (2012) describes the aesthetic experience, a multisensory activity rooted in the visual, as one that can make conscious short- and long-term memories and elicit empathy. He also notes that aesthetic experiences are highly synthetic in terms of brain activity, in that they stimulate the prefrontal cortex (the locus of complex cognition, decision making, personality, and self-moderation) in concert with the limbic system (which involves emotions, memories, and fundamentally, self-preservation). Art historian Barbara Stafford (2007, 2008), who explores the impact of recent neurobiological research on our understandings of art, vision, and cognition, describes viewing art as a somatosensory experience, one of heightened attentiveness. She notes that it activates, and crucially has the potential to enable awareness of, high-level cognitive functions like intention, organization, and selection. These neurobiological findings cast light on why "eyes-on-canvas" time is particularly influential to the development of aesthetic thought.

The cultivation of aesthetic thought—and, as this chapter argues, visual literacy—is fundamentally intertwined with active engagement with art because of

art's mix of observable information, emotional valence, ambiguity, and inferred meanings, some symbolic or metaphorical. Interactions with art involve a constant exchange between stimulus and response and between the viewer's memory and current experience, building new frameworks through which to view the world. VTS is designed to fully exploit the richness of the art experience and its impact on cognition.

The VTS Protocol

VTS is constructivist in nature, aligning with precepts articulated by John Dewey (1934/1980, 1938/1997), Jerome Bruner (1966), and Lev Vygotsky (1962, 1978). It focuses on teacher-facilitated but viewer-directed discussions of art. The art is carefully chosen to provide subjects of relevance to the particular audience, always including accessible imagery to give participants a chance to begin by using their existing knowledge, interests, and abilities. Images also contain enough ambiguity to pique curiosity so that what is recognized is used as the basis for exploring what is puzzling (Yenawine 2003, 2013). The looking is activated by questions asking viewers to start with a task that is simple for them—making observations—and helps them improve upon existing skills by presenting challenges within their reach and by fostering discussion. These actions spur intensive, ongoing engagement with and authentic experience of complex visual material.

VTS was developed over an iterative process of testing and using data to make revisions that lasted 10 years, beginning in 1991. The resulting protocol instructs facilitators as follows:

Present a carefully selected image. Appropriate images account for the levels of experience with art, ages, and backgrounds of the specific group, and contain:

- Subjects of interest
- Imagery that represents both familiarity and newness
- Strong narratives, accessible but layered, i.e., deep
- Accessible intrigue: challenge but do not completely stump them
- Ambiguity: enough complexity to puzzle and inspire debate

Allow a few moments of silently looking before beginning the discussion.
   Pose three specific research-tested questions to motivate and maintain the inquiry:

- What's going on/happening in this picture? (Asked once to initiate the discussion)
- What do you see that makes you say that? (Asked whenever an interpretive comment is made)
- What more can you/we find? (Asked frequently throughout the discussion to broaden and deepen the search for meaning)

Facilitate the discussion by:

- Listening carefully to catch everything that students say
- Pointing to observations as students make comments, providing a "visual paraphrase"

- Paraphrasing each comment, taking a moment to reflect on it while formulating the response to make sure all content and meanings are grasped and helpfully rephrased
- Linking related comments whether students agree or disagree, or build on one another's ideas
- Remaining neutral by treating everyone and each comment in the same way

Conclude by thanking students for their participation and by citing behaviors that are particularly appreciated.

The method was constructed from Housen's data about beginning viewers (those in stages 1 and 2) and studied by way of her original research protocols. It was tested and tweaked to ensure that it nurtured the capacity of students to construct more and more complex meanings from works of art.

Rigorous facilitation using the specific techniques is critical to a successful VTS conversation. For example, opening with silence is necessary, for it provides each student the opportunity to form independent thought. Wording matters: phrasing the evidence-seeking question as, *What do you see that makes you say that?* instead of, for instance, *Why do you think that?* establishes a psychologically safe environment in which focus is placed on the work of art rather than the student personally; provisional ideas are welcome but visual evidence is consistently sought. The teacher's neutrality matters because it leaves students free to find and think what they will, and it nurtures mutual respect among students, necessary for wide participation and risk taking. Repeatedly asking *What more can we find?* extends the process, allowing the group to find many possible answers. Linking allows the discussion to cohere while honoring disparate ideas.

By adhering to the method, which is intentionally precise, ideas can be openly discussed and tested; multiple perspectives can be reasonably, simultaneously considered based on evidence found in the image. VTS provides a means to hold the group in a process of inquiry, one in which divergent and convergent thinking, evidence seeking, and wondering intermingle.

A modest intervention in terms of time, the VTS school curriculum (Housen and Yenawine, 2000-2001) involves ten 1-h lessons a year using the above method to look at two to three images per lesson throughout the elementary grades. The basic curriculum covers grades Pre-K to 6 and includes recommendations for building on experience with art in other lessons, including using images as prompts for writing; it also includes additional prompts and basic research projects when students show signs of entering stage 3. Currently, VTS is being implemented in over 300 schools in the USA (Yenawine 2013; Shifrin 2008). Versions for middle school and high school are being tested. Variations have been devised for use in museum teaching, university classes (Miller and Yenawine 2014; Hailey 2014), medical education (see next page), and the professional world.

Data from studies designed to determine if VTS achieved the desired effect in elementary schools documented that it did indeed cultivate aesthetic development through stage 1 and well into stage 2; in concert, the techniques create a vigorous learning environment applicable with other imagery, subjects, and materials. Teach-

ers currently use the strategy to allow students to construct meaning from a wide range of images as well as texts, and many teachers have implemented VTS in history, literature, math, and science lessons (Yenawine 2013).

Literature Review and Findings

What is known in research about the impact of VTS? What do these findings mean for our understandings of visual literacy? This chapter's summary of existing research is limited to peer-reviewed literature, two federally funded studies, and one recently published dissertation, though substantial knowledge from the realm of practice shapes the analysis of this research. It is important to note that Housen, Yenawine, Karin DeSantis, and others studied additional examples of VTS teaching and learning throughout the development of the VTS curriculum (DeSantis and Housen 1984–2003). Findings from many of these unpublished studies (undertaken in various school systems and in museums in different parts of the country) have been shared collegially across sites and at conferences. They were used to evaluate and inform the content of VTS curricula yet do not exist in peer-reviewed journals.

Data discussed here came from two distinct realms in education: first, K-6 partnerships with art museums and second, training programs within the healthcare professions (often in collaboration with art museums). It is important to acknowledge a key difference between VTS in K-6 and in medical education; research from K-6 interventions reflects the impact of the sequential VTS curriculum (discussions of a consistent body of carefully chosen images facilitated at regular intervals, approximately 10 hours a year over 3 or more years, using the method of teaching across sites), while the VTS-based interventions in healthcare vary widely in scope (the longest intervention capped at about 12 hours of total time of VTS, allocated over 3 months), in the works of art used, and in the integration of VTS with other methods (such as structured reflections, clinical didactics, and drawing).

Impact Shown in Elementary Education

The VTS school curriculum was tested in studies beginning in 1991 at MOMA in New York City as well as in St. Petersburg, Russia; Vilnius, Lithuania; Byron, Minnesota; and San Antonio, Texas (Housen 2002, 2007; DeSantis and Housen 2007). Formal academic longitudinal research was conducted in one semirural school in Byron. The study tracked two cohorts, one advancing from second to sixth grade and the other from fourth to eighth, and was published in 2002. Another formal study—still unpublished—was conducted in one urban school in San Antonio; it tracked mostly English language learners from grades 3–5 (DeSantis and Housen 2007). Both studies included matched control groups, the differences being that only the experimental students received VTS. Housen's protocols for determining aesthetic stage were applied before and after the sequential-curricular intervention during each of the study years and were enlarged to include additional methods.

The published data from Byron from 1993 to 1998 (as well as the unpublished San Antonio research) indicate that roughly 30 hours of focused experience with art—Housen's "eyes on canvas"—nurtured a transition from the first stage of aesthetic development to solid ground in the second. In Byron, all the students grew by an entire aesthetic stage over the course of 3 years (Housen 2002). The study further documented the impact of aesthetic growth and VTS itself on a broader range of skills, including thinking behaviors considered aspects of critical thinking: habitually providing evidence to back up inferences and speculating among various possible interpretations, for example. The predictable expansion of these habits in the vast majority of students was correlated to their aesthetic growth; critical thinking capacities began to emerge predictably when students advanced into stage 2.

The Byron study also showed that these thinking skills transferred from art images to objects from other realms such as science. These findings were derived from thoughts expressed in an additional protocol, the "material object interview," in which students were given an unfamiliar object—fossils, foreign coins, unusual tools—and asked to look and talk about what they saw. Unexpectedly, Byron intervention students also improved in performance on standardized tests after 3 years of VTS, gaining 2.5 times the state average increase on Minnesota achievement tests, suggesting possible transfer of skills from aesthetic development to other domains.

Two separate, federally funded studies (Curva et al. 2005; Adams et al. 2007) were conducted in schools participating in VTS projects at the Isabella Stewart Gardner Museum in Boston (Burchenal and Grohe 2007) and at the Wolfsonian-FIU Museum in Miami (Rawlinson et al. 2007). These longitudinal interventions, which included roughly 30 hours of VTS lessons over 3 years, were shown to impact student thinking patterns in a manner that correlated with the increases in critical thinking skills observed in Byron. VTS students consistently talked or wrote significantly longer than control students about artwork in posttest interviews and writing samples (examples of which are detailed below), indicating increases in students' capacities to observe, infer meaning, and back up inferences with evidence. In the Gardner Museum study, for example, VTS students averaged 28 lines per interview compared to 14 lines for control students. Across the three K–6 studies (Byron, Boston, and Miami), all treatment students looked longer, had more to say, and demonstrated a wider range of thought categories in their responses following VTS interventions. Consistently, 30 hours of VTS discussions over 3 years facilitated changes from stage 1 into late stage 2 within the groups.

Impact Shown in Healthcare Education

The literature on VTS interventions with students in medical training programs echoes the K–6 findings in the development of thinking and language skills, and also indicates attitudinal impact. A 2008 study at Harvard Medical School analyzed a 10-week intervention with first- and second-year medical students that mixed VTS with clinical didactics and drawing (Naghshineh et al. 2008). Results in posttest writing samples included significant increases in frequencies of observations—students made 38% more observations on both medical and art imagery than control

group students—and in frequencies of use of evidence to back up interpretations. Importantly, students who attended eight or more sessions increased observation and language skills significantly more than students who attended seven or less. This "dose effect" speaks to the developmental nature of acquiring visual literacy skills. This finding is underscored by a researched pilot experiment at Robert Wood Johnson Medical School (RWJMS; Jasani and Saks 2013), in which students who participated in one intensive VTS-based workshop (they discussed eight images over 3 hours) did not show any differences in frequencies of observations made in writing posttests.

The Harvard and RWJMS studies, along with others from the healthcare sector, also illuminate the impact of VTS on language development. The Harvard study included qualitative analysis of student writing samples documenting "increased sophistication" in the words students chose to describe both clinical and art imagery (i.e., the increased or new use of words such as "shading" or "contour"). These language changes reflect that students' abilities to observe, infer, and express meaning from visual material (either clinical or artistic) became more robust and precise. In addition, students' descriptions of visual material became more comprehensive, as demonstrated in the RWJMS intervention, where analysis of writing samples documented increases in use of speculative language, visual analogies, and in the scope of interpretations.

A third study conducted at the University of Texas Health Science Center in San Antonio (Klugman et al. 2011) looked at the results of three 90-min VTS-based sessions with medical and nursing students; researchers examined student responses to both art and clinical imagery with both qualitative and quantitative tools in order to assess learning. Across the three studies—Harvard, RWJF, and Texas—students looked longer and had more to say following VTS interventions, indicating their enhanced performance of three crucial aspects of clinical observation: the ability to describe concretely what is perceived, the ability to separate fact from inference, and the understanding that observation takes time (Boudreau et al. 2008).

Finally, one radically different program in the Netherlands using VTS with brain-injured patients further probed the impact of VTS on language abilities (Ter Horst and Kruiper-Doesborgh 2012). This pilot study with 13 patients documented increases in the tendencies to take time to reflect before speaking and to give reasoned opinions. Subjects also reported increased awareness of their own abilities with regard to critical thinking, and their difficulties in this respect. This study underscores the way in which changes in visual literacy connect with metacognition and are reflected in language use.

In addition to looking at skill development, studies on VTS from the healthcare professions have also focused on the methodology's effect on attitudes and beliefs about learning. Klugman et al. (2011) documented increases in positive views towards the essential role of communication within health care, and the importance of discussions about what is seen and found as being necessary for effective diagnosis; they also showed an increase in participants' tolerance of ambiguity—a cognitive variable significant to aspects of medicine including worldview, test ordering, defensive practice, and discomfort in scenarios of death and grief (Geller 2013). A

separate qualitative study on nursing students' experiences with VTS at Indiana University revealed two standout themes: "feeling safe in learning" and "thinking and seeing differently" (Moorman 2013). Students particularly valued that during VTS discussions, they were able to express differences of opinions without feelings of criticism or judgment. They also positively emphasized the experience of having their own judgments change based on observations made by others. "Ok, I can see how you got to this" is how one student describes this experience, which connects with "mutual respect," a subtheme of the Indiana study.

A qualitative study from the social work field, conducted at the University of North Carolina, Chapel Hill, examined an intervention in which VTS was used in diversity training for teachers (Chapman et al. 2013). The researchers looked at both "schema change" and how images function in catalyzing dialogue. Their findings noted changes in participants' descriptions of "shifts in awareness, perspective-taking, attitude change, and more complex thinking about Latino/Latina immigrants" (the subject of most of the images used in this case). Many of these attitudinal findings reflect participants' reconciliation of their own visual experiences with the experiences of others, suggesting the persuasive influence of social interactions as part of the visual literacy learning process, and its potential to alter schemas about the construction of knowledge.

What Do Shifts into Visual Literacy Look Like?

While the research findings synthesized above speak to the impact of VTS on elementary school and medical students, this section offers descriptions of the behaviors that mark shifts into visual literacy and provides specific examples. Understanding of these behaviors has evolved over time, through tracking both VTS discussions and writing samples. Here is what these authors have come to look for:

- Participants make more observations than when they started, and their observations become more complex and include more detail. Things seen singly come to be seen in a context.
- As participants begin to make meaning from their observations, they draw more and more complex inferences. They develop the habit of providing visual evidence to back up their inferences, interpretations, and opinions.
- They increase their use of conditional language to indicate awareness that what they suggest might be open to other interpretations.
- While at first they might be content with a single interpretation of what they see, they come to speculate among possible meanings, often holding several as equally plausible, including those offered by peers.
- After some time, they counter their own first thoughts and knowingly revise earlier impressions, often stimulated by the ideas put forth by others.
- They begin to cycle back to earlier ideas to elaborate by adding detail or clarifying.
- They develop a desire to know more about the makers of images and their intentions; the motivation for seeking additional information from other sources to fold into their analysis.

Fig. 1 Winslow Homer, *Snap the Whip,* 1872, oil on canvas. (Butler Institute of American Art, Youngstown, OH, USA/Museum Purchase 1918/Bridgeman)

- They apply all of these thinking and language skills to a range of visual vocabularies across many media and images from diverse times and cultures. This capacity eventually transfers from art to material objects, historical documents, medical imagery, and scientific imagery including scientific imaging systems (maps, charts, diagrams). It can even extend to their understanding of other people, such as fellow students, medical patients, or colleagues.

Two examples of changes in student writing illustrate some of these points on a granular level: one from a third grader, the other from a third-year medical student. The third grader's samples show the developmental nature of visual literacy as it is facilitated by VTS experiences. They make visible how language reflects thinking about what is seen, and how thinking patterns change in response to effectively stewarded, open-ended discussions about art—in other words, how visual literacy grows (Fig. 1).

On November 14, 2003, a third grader in a Miami, FL, school (Adams et al. 2007; Curva et al. 2005) wrote for a pretest, which sampled his thinking as it appeared in writing before beginning the VTS curriculum. He and his classmates were asked to look at Winslow Homer's painting, *Snap the Whip,* and to write an answer to the question, "What do you think is going on in this picture?" They were also asked to include as much detail as possible and to provide evidence of their ideas. He wrote:

> I think that the boys are playing in a field outside a school and that there are no girls in the picture.

The student summarizes what he sees in the picture, noting "boys playing" (observation and inference) as well as other observations—"a field" and "outside a school"—providing no evidence. He also observes the absence of girls. He begins with "I think" perhaps responding to the phrasing of the assignment but possibly

indicating awareness that this might be a subjective opinion. Overall, he puts forth a reasonable description of the scene depicted, albeit minimal and lacking in details.

In a follow-up posttest given the same instructions and image in early May 2004 after the first year of ten VTS lessons, he wrote:

> I think that the boys just got out of school because I see that there is a building that looks like an old fashion school house. I also think that the boys are having recess. I think that they are playing ring around the rosies. I also think that they are at the country side because I see mountains.

Again introducing each comment by "I think," the boy's opening compound sentence contains a description of the central figures ("the boys") as "out of school" argued with a detailed observation as evidence: "an old fashion school house." He infers that the boys might be at recess, a conclusion likely based in the same logic, and he further infers that they are playing a specific game ("ring around the rosies") though he provides no evidence to back this up. He concludes with a comment that takes in the context ("the country side") providing evidence ("I see mountains").

This child's dramatic shift from two basic, unsupported, observations to several inferences (three out of four backed up with evidence) documents his growing ability to infer meaning from observation and the provision of visual evidence, as well as his persistence in looking and finding more. To convey his deeper looking, he wrote a good deal more and included descriptive detail (Fig. 2).

Fig. 2 Paul Mathey, *Woman and Child in a Room,* 1890s, oil on canvas. Musée d'Orsay, Paris. (By permission of Art Resource, NY/ Photo Eric Lessing Images)

Another sample of his writing, written shortly before this posttest but after a discussion of the image included here with his classmates, also reveals burgeoning visual literacy, especially behaviors borne in group meaning-making experiences.

> I think the boy is punished because his face looks sad. I also think he got into a fight because his knees look dirty. I also think that the man at the top left of the picture is a (*maid?*) and the lady is the boy's mom because it looks like she is using a sewing machine. I also think that the boy just came in from outside because in the old days people used to play with those types of hula hoops. I think that the time of the day is afternoon because the light is very bright. I also think the wallpaper design is a tree because I see leaves.

This writing sample reflects a dramatic difference in terms of inferences made (nine), all but one argued in evidence (the "maid.") He provides significant details including reference to the boy's expression, time (both historical time "the old days" and time of day "afternoon"), and several aspects showing his attention to space ("at the top left," "in from outside," and "wallpaper design"). While the posttest shows what sticks with the student when working on his own, the post-discussion sample shows the rich impact of peer interaction on the growth of individuals (Yenawine 2013).

Can we see similar shifts in visual literacy as a result of discussions among adults? A second example, below, shows a shift in observation skills and language from pre- and post-VTS writing samples from a medical-school student highlighted in the Robert Wood Johnson Medical School study. Written in response to clinical imagery, this sample is cited by the study authors as an example of shifting away from "subjective terminology":

> **Pretest**: "His right arm and leg are positioned normally…"
> **Posttest:** "Her right arm and leg are straight and lay flat. Her left arm is flexed at the shoulder and elbow with the hand clenched in a fist with the thumbs extended away from the fingers. The left leg is flexed at the hip and knee.

This pairing shows the students' initial impulse to use an assumptive word ("normal"), which she then changed in favor of describing the observations that triggered associations with the word normal. These changes rendered the description lengthier (from 8 words to 45) and based specifically upon what was actually observed rather than inferred.

These changes in vocabulary suggest the student gained the insight to separate observation from inference at a metacognitive level. This pattern, reflected broadly among VTS students, involves the conscientious mental work of suspending judgment. "Overcoming the inertia that inclines one to accept suggestions at their face value," writes Dewey in *How We Think* (1910/1997, p. 13), "involves willingness to endure a condition of mental unrest and disturbance." Such work is not easy (Dewey later calls it "painful," p. 13), yet such careful management of our impulses to arrive at conclusions is not only the basis of thoughtful decision making but also essential to avoiding errors in judgment. In medicine, for example, "search satisfaction error" and "premature closure" are two types of error undergirding a significant proportion of medical misdiagnosis (Croskerry 2003); at the root of both lies the cognitive tendency to close searches too early.

What Does Research on VTS Indicate About Visual Literacy?

The same careful looking, thinking, and precise description demonstrated by expert diagnosticians are at the heart of visual literacy—and cultivated by VTS. Visually literate people have the disposition to sustain the act of observation, recognizing that taking time to look is an essential part of the inquiry process and remaining confident that such looking will reveal new information and possibilities. The studies cited above begin to describe how group experiences discussing art through VTS, in which participants engage with one another as well as the work of art, nurture the linked skills of observation, inference, speculation, elaboration, and seeking and providing specific evidence, while concomitantly developing language.

The findings underscore the longitudinal nature of developing visual literacy and indicate how it is entwined with attitudes and beliefs about knowledge. As students develop visual literacy, they learn how knowledge is created, their role in creating it, the time it takes to acquire it, the role of biases in shaping it, and the sense that it is rarely fixed but instead constantly evolving. Related, they may also become comfortable with ambiguity, a capacity essential to discovery in any discipline from the arts to history and science—indeed, to grappling with the real world in general. While most schooling prepares students to expect problems to be resolved fully and speedily, the process of becoming visually literate fosters the disposition to accept ambiguity as fundamental and the capacity to address it as a basic element of inquiry—one that requires time, a commitment to questioning any material confronted, and the awareness that understanding is enriched by the perspectives of others.

These capacities are markers of visual literacy as described by Debes (1968), the pioneering thinker in the visual literacy field whose definition grounds this chapter's considerations. They fall into place as students move into Housen's stage 2, a long stage that involves the development of multiple frameworks for figuring out why an image looks as it does, as well as probing its possible meanings. Over the course of VTS interventions, spread over time to allow for gestation, the pattern of thinking that emerges by the end of stage 2 aligns neatly with the basic capacities included in Debes's definition of visual literacy to "discriminate and interpret" as well as "comprehend and enjoy" what one encounters in the visual environment. In addition, the process of VTS—a teaching strategy of carefully facilitated group discussions—nurtures the ability to "communicate with others."

The findings reviewed above suggest that key aspects of the VTS protocol were essential to the results: open-ended, rigorous facilitation, provocative works of art, ample gestation time, and a context of peers. Moreover, an environment in which students feel safe to cross boundaries into the experiences and perspectives of others is particularly important to attitudinal shifts. Visual literacy requires the propensity to integrate new information from different and perhaps unexpected or atypical sources, suggesting change across the thinking and sensory spectrum. As Moorman's dissertation indicates, effective experiences in visual meaning making depend on a learning context of psychological safety and mutual respect—one that must be cultivated with deliberate pedagogical actions.

Need for Further Study

More research is needed on the impact of longitudinal VTS interventions in the development of visual literacy, on the relationships between aesthetic thinking and visual literacy, and how Housen's research and theory on aesthetic development might be expanded and built upon, in particular, in concert with flourishing discoveries in neuroscience.

One significant potential area of research concerns how VTS impacts teachers. Because facilitating VTS discussions about works of art is quite different from most pedagogical methods, and because the process of learning the facilitation method takes time, practice, and both personal and analytical reflection, its effect on transforming teacher practice may be significant. While changes in teachers as they come to understand VTS have been observed and discussed anecdotally for years by Housen, Yenawine (2013), and colleagues at the Isabella Stewart Gardner Museum (Grohe and Egan 2014), as well as some practitioners in the medical field (Hershman et al. 2016; Fleischer et al. 2014), this potential impact deserves far more systematic study. Informal reports indicate that VTS facilitation strengthens abilities to teach using authentic, open-ended problems across subject areas, enhances teachers' abilities to listen to and understand students, provides teachers with awareness of their own communication habits, and offers them an opportunity to examine the alignment between their philosophies and practices as educators. In addition to testing these anecdotal findings, research questions might include: How does the aesthetic stage of the teacher impact the ability to teach visual literacy? How does implementing the VTS curriculum shift the attitudes and practices of teachers across subjects, and, by extension, their performance and job satisfaction?

Beyond the question of teaching, proposed future research topics comprise, but are not limited to, the following:

- How does the development of visual literacy affect attention and metacognition? What parts of the brain are activated during VTS discussions, and what does this tell us about cognition and the impact of discussions of art on the development of visual literacy?
- What is the impact of VTS on critical thinking, communication, and language at various ages, and with challenged students (from English language learners to those with impairments and on the autism spectrum)?
- How does aesthetic stage influence the ability to construct visual communication, from drawings to graphs to films to digital media?
- What is the impact of increased visual literacy on standardized test performance in K–12 education?
- What gaps might be filled by using VTS to advance visual literacy within undergraduate studies? How might the methodology be implemented within intra- as well as cross-disciplinary studies with a variety of visual materials? What might be the outcomes for both faculty and students?
- What impact does increased visual literacy have on diagnostic accuracy and patient satisfaction?

- How does VTS and enhanced visual literacy impact collaboration, leadership and team roles, and problem solving within a range of settings, from schools to hospitals to professional organizations and business environments?

To pursue these and other avenues of research, scholars and scientists will need to apply many additional verified measures of achievement in education, quality in health care, collaboration between individuals, and job satisfaction in the workplace. Advances in neuroscience and brain imaging open a world of opportunity to understand the mechanics of aesthetic development and visual literacy that could be used to create additional pedagogical models that nurture both. Researchers may also interrogate aesthetic development and cognition according to protocols other than those of developmental psychology or Housen. All of this research should lead to deeper understanding of VTS, as well as additional approaches to the teaching of visual literacy.

Conclusion

In all of the contexts in which it is regularly practiced, VTS discussions of art play several important roles essential to understanding, developing, and valuing visual literacy. First, by enhancing participants' aesthetic thought, and thereby deepening the range and complexity of frameworks through which they analyze what they see, VTS enables students and teachers to experience artworks as generators of ideas, not mere illustrations of concepts normally confronted through texts or other non-visual means. Effective integration of discussions about art into traditional teaching contexts supplements, and can potentially transform, traditional knowledge bases and problem-solving techniques.

Second, the VTS discussion is a rare space in which students' personal knowledge and experience (including their memories and beliefs) are authentically activated and applied to useful advantage. They may experience, safely, some cognitive dissonance as they come into friction with other ways of knowing and being—ways posited by the work of art itself as well as the opinions and ideas of their peers. Over time, students become empowered to discover themselves and interrogate their and others' constructions of identity and society—and propose new alternatives—through the practice of active looking.

Third, VTS models what might be called participatory visual literacy, or visual experiences that are essentially social exchanges. It is important to understand visual literacy as interactive and in flux—as an ongoing, developing way of functioning critically within and responding to the full sensory environment with a questioning, curious mind (Crouch 2008; Dallow 2008). Humanities and digital media scholar Peter Dallow (2008) describes the visual "as being like an interface or cultural zone of social exchange…a social sphere or arena where contemporary views of reality are displayed;" he adds that "a notion of visual literacy could be the capacity to negotiate or 'navigate' this visual cultural zone" (p. 98). The simple yet rigorous

structure of VTS can become a powerful compass for this zone, as students together traverse spaces of wonder, inquiry, and uncertainty—art.

Fourth, VTS cultivates an inquiring, attentive mind. In *How We Think,* John Dewey (1910/1997) wrote, "the most important factor in the training of good mental habits consists in acquiring the attitude of suspended conclusions, and in mastering the various methods of searching for new materials to corroborate or to refute the first suggestions that occur" (p. 13). During VTS discussions, students listen and talk with equal attention, reflect on their own and others' thinking, shift perspectives based on what others notice, gain comfort with ambiguity, learn the impact of providing visual evidence, hold multiple perspectives simultaneously, fail and recover through persistence, and realize there can be more than one plausible answer. To put it another way, the work of art changes before their very eyes and in their minds as they discuss it. The attentiveness fostered by VTS deepens and extends the meaning-making experience, as they find more and more, constructing and deconstructing an array of viewpoints as the visual is persistently mined.

Barbara Stafford (2007, 2008), whose work focuses in part on "conscious vision in the construction of experience" (2007, p. 98), calls for pedagogy that can enliven the brain's attentive functions. She argues that the 10 % of the brain's neuroprocessing that is not automatic (or autopoietic) has the potential for what she calls "willed perception" (2007, p. 202) and should be nurtured. She describes the creation of art as an example of this kind of conscious visual activity. Of developing a similar, full sensory attentiveness through education, she writes,

> Seeing, not seeing as, enables knowledge to grow. Educating the remaining ten percent, then, is about showing students the deep effects of volition and effort…. By changing the way they think about their thoughts, they can change their brains as well as the world. (2008, p. 46)

VTS structures experience to cultivate tolerance of such "volition and effort," or in Dewey's words again, the "willingness to endure a condition of mental unrest and disturbance." Students eventually come alive to their own thinking and become aware of their role in understanding what they encounter—indeed, potentially, of how they construct their knowledge of the world and, by extension, their construction of the world itself. By experiencing how meaning can be plumbed through extended looking, students gain comfort with, and more willingly explore, ambiguity; better understand and empathize with each other; and exist in a more attentive, present state of awareness. They learn that interactions with the world and our fellow beings require multisensory engagement and thinking across domains.

Just as medical professionals who slow their process become better care providers, most of us across the working spectrum could benefit from the heightened awareness of and empathy toward other people that visual literacy affords. These qualities could become part of the values of those who govern and create social policy. Intentional teaching of visual literacy is, in these authors' view, core to addressing the issues we face globally. Who knows how many problems such skills might help us solve?

Appendix

Abigail Housen's stages of aesthetic development with details about stages I and II added. All quotes appearing here are taken from Aesthetic Development Interviews Housen and associates conducted over 18 years. Aesthetic Development Interviews are nondirective, stream-of-consciousness-type interviews (Housen 1983).

Stage I	*Accountive* viewers are list makers and storytellers. Using their senses, memories, and personal associations, they make concrete observations about the work of art and weave them into a narrative. Here, judgments are based on what is known and what is liked. Emotions color their comments, as viewers seem to enter the work of art and become part of the unfolding narrative. *Sampling of thoughts* At stage I, accountive viewers viewers make simple, concrete observations: *lines, ovals, squares*…. At times, the stage I viewer makes observations and associations that appear idiosyncratic and imaginative: *A giraffe's back…a dog's face*. Likewise, the stage I viewer may incorporate people and objects into an idiosyncratic narrative: *I see two ladies, holding each other. It seems to me he is going home now, and he cannot find his clothes*. Judgments are based on what the viewer knows and likes: *The wallpaper is beautiful*. Emotions color the comments, as the stage I viewer animates the image with words and becomes part of an unfolding drama: *Like he is hurt [his arms] when he was swimming or like he was mad or something the way he was holding his arms*. The stage I viewer (the "storyteller") and the image (the "story") are one. The viewer engages in an imaginatively resourceful, autonomous aesthetic response.
Stage II	*Constructive* viewers set about building a framework for looking at works of art, using the most logical and accessible tools: their own perceptions, their knowledge of the natural world, and the values of their social, moral, and conventional world. If the work does not look the way it is "supposed to"—if craft, skill, technique, hard work, utility, and function are not evident, or if the subjects seem inappropriate—then this viewer judges the work to be "weird," lacking, and of no value. The viewer's sense of what is realistic is a standard often applied to determine value. As emotions begin to go underground, this viewer begins to distance him or herself from the work of art. *Sampling of thoughts* At *stage II, constructive,* viewers' observations have a concrete, known reference point: *And they have five fingers, just like us*. Aspects of images that do not conform to expectations can be seen as "weird": *The hair on the first person is blond, and it is true, but there is no such thing as a purple face*. As this viewer strives to map what she sees onto what she knows from her own conventions, values, and beliefs, her observations and associations become more linked and detailed. The viewer looks carefully and puzzles. An interest in the artist's intentions develops: *The person has chosen; instead of using circles for the background, he used lots of diamonds.*
Stage III	*Classifying* viewers adopt the analytical and critical stance of the art historian. They want to identify the work as to place, school, style, time, and provenance. They decode the work using their library of facts and figures that they are ready and eager to expand. This viewer believes that properly categorized, the work of art's meaning and message can be explained and rationalized.

Stage IV	*Interpretive* viewers seek a personal encounter with a work of art. Exploring the canvas, letting the meaning of the work slowly unfold, they appreciate the subtleties of line and shape and color. Now, critical skills are put in the service of feelings and intuitions as these viewers let underlying meanings of the work—what it symbolizes—emerge. Each new encounter with a work of art presents a chance for new comparisons, insights, and experiences. Knowing that the work of art's identity and value are subject to reinterpretation, these viewers see their own processes subject to chance and change.
Stage V	*Re-creative* viewers, having established a long history of viewing and reflecting about works of art, now "willingly suspend disbelief." A familiar painting is like an old friend who is known intimately, yet full of surprise, deserving attention on a daily level but also existing on an elevated plane. As in all important friendships, time is a key ingredient, allowing stage V viewers to know the ecology of a work—its time, its history, its questions, its travels, and its intricacies. Drawing on their own history with one work in particular, and with viewing in general, this viewer combines personal contemplation with views that broadly encompass universal concerns. Here, memory infuses the landscape of the painting, intricately combining the personal and the universal

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Philip Yenawine Philip is cofounder of Visual Understanding in Education (VUE), a research organization that studies ways of teaching visual literacy, thinking, and communication skills. VUE's curriculum, VTS is in use in schools across the USA and abroad. Director of education at The Museum of Modern Art from 1983 to 1993, he also directed education programs at The Metropolitan Museum of Art and Chicago's Museum of Contemporary Art. He was founding director of the Aspen Art Museum and consulting curator at the Institute of Contemporary Art (ICA) in Boston. He taught art education at the School of the Art Institute in Chicago and Massachusetts College of Art. He was the Miller visiting scholar at the University of Illinois in 1996 and awarded an honorary doctorate from the Kansas City Art Institute in 2003. He received his master's in art education from Goddard College in 1979. He received the National Art Education Associations Award for Distinguished Service in 1993, among other honors. He is author of *How to Look at Modern Art, Key Art Terms for Beginners,* six children's books about art, and most recently, *Visual Thinking Strategies: Using Art to Deepen Thinking Across School Disciplines.*