Light Lies: How Glass Speaks

Kathleen Connellan
University of South Australia
Kathleen.Connellan@unisa.edu.au

Damien W. Riggs
Flinders University
damien.riggs@flinders.edu.au

Clemence Due
Adelaide University
clemence.due@adelaide.edu.au

ABSTRACT
Light illuminates but also reflects, and when the medium of glass is a dominant design material it communicates within the architectural space. In this paper we suggest that the transience of light and transparencies of glass posit a duplicity that is aesthetically seductive but communicatively misleading. Specifically, the central aim of the paper is to address where truth sits between reflections and reason in the glass surfaces of a mental health environment. To provide a framework the paper first covers a brief history of glass, engages with its technological properties, its language(s) of the inner and outer, its aesthetic effects in an architectural poetry of light, and the messages conveyed to vulnerable clients and careful clinicians. Then, using a detailed case study of a purpose built mental health ward in Australia, we explore how glass engenders visibility, security, surveillance and power, concluding with recommendations for future builds.

Categories and Subject Descriptors
H.0 Information Systems: General

General Terms
Documentation, Design

Keywords
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INTRODUCTION
How can something inanimate, such as glass, speak? And if it does, does it speak honestly? This paper assumes that glass does have a voice, one that speaks of light and transparency. But it also speaks of fragility and fear with its potential to break into sharpness. It is the veracity of glass as a communicator that we consider at stake in the often fraught environment of the mental health ward. In this paper we extend upon a previous paper in which we suggested that the use of glass in design for mental health sends simultaneous messages of freedom and its lack (Connellan, Due, & Riggs, 2011a). In this paper we specifically engage with communication design issues in space and place in the context of a mental health ward. We do this by exploring how glass works semiotically to communicate the themes of visibility, security, surveillance, and power. The transience of light and the transparencies of glass, we posit, suggest a duplicity that is aesthetically seductive but communicatively misleading. We begin with a brief history of glass in western architecture, then move to foregrounding visibility and security in the mental health setting, which leads into conversations about glass between interior and exterior spaces in a case study of a purpose-built mental health unit. In the final section we return to the key issue of where truth sits between reflection and reason in the glass surfaces of mental health. We consider this topic important because whilst the aesthetics of ambiguity might be beautiful to behold on the facades and interiors of many buildings, people residing and working in a mental health ward need to believe what they see.

GLASS IN WESTERN ARCHITECTURE
Glass and light are synonymous in the language of architecture and light in western imaginaries (emerging as they do from the Judaeo-Christian tradition) and carry promises of redemption through the pathway of "purity" (Connellan, 2009; Dyer, 1997; Wigley, 2001). Light in these contexts is the harbinger of a promised freedom. When natural light is harnessed by architects, it can bring life into

1 Mental health is the term used in the Australian media and also in health discourses in Australia. The authors are aware that this term is euphemised in some other countries.

an otherwise stultified interior space which might be deadened by fluorescents or simply gloomy in the absence of adequate light. The way in which natural light most obviously moves in and through interior spaces is through glass and openings. Glass only began to be used in pieces larger than the lead light method of Gothic Cathedrals (c.1400 – 1500) in nineteenth-century England. The first large-piece glass architecture was known as the Crystal Palace, and it was designed and built by Sir Joseph Paxton (who learnt this technique in his role as Royal gardener) in 1851 for the first trade exposition in the world—the "Great Exhibition" in Hyde Park, London. Following this innovation of panelled glass strengthened and sectioned by rolled iron, the technology improved and soon iron was replaced by steel so that glass panels could be even larger than those made for the Crystal Palace.

Modernism was the time of the "curtain wall," the dictum of "form follows function," (Sullivan, 1896) and of "less is more" (Illinois Institute of Technology, 2012). The "curtain wall" literally means a wall of glass. This is now referred to as the "skin" or "envelope" of the building. This was achieved by overcoming the need for load-bearing brick walls through the new ferro-concrete, which was reinforced by steel, allowing glass to wrap around buildings. In this way "more" became "less" as heavy opaque walls were replaced by light transparent glass. Sheet glass, picture windows, glass screens and panels were all used to bring the outside inside. Modernist architects feted the interior-exterior flow of sunlight and space. This was a move away from the solid barriers that the brick or stone wall presented to the outside world or indeed to the inside world of inhabitants.

Yet whilst this brought many glistening jewels to city skylines (and continues to do so), the extensive use of glass has also had its critics. Advocates call it an "intelligent" material (Addington & Schodek, 2005; Compagno, 2002) and applaud its strength, beauty, and versatility (Bell & Kim, 2009), whilst environmentalists warn of the problems of heating, glare, and reflection and therefore suggest that glass must be used intelligently (Abaza, 2000; Bally, 2002; Gissen, 2003; Guy, 2001; Thibaud, 2001). Work has also been done on the politics of glass in particular architectural settings such as courts of justice, which has a bearing on mental health units (Resnik & Curtis, 2011). Resnik and Curtis write that the connection between glass and access to justice is "simplistic," presenting the contradiction of "opaque transparency" (p. 341). As researchers seeking to examine the relationship between architecture and mental health, we add our voice to all these discussions in relation to our key issue for this paper, namely: Does glass tell the truth?

GLASS IN THE CONTEXT OF MENTAL HEALTH: THEORY, VISIBILITY AND SECURITY

Glass technologies are closely aligned with historical and contemporary theories on seeing and being seen. Surfaces have long been used to communicate to those who look upon them; in the discipline of art theory for example, Krauss (Foster, 1988; Krause, 1988) engages with "the impulse to see" into the flat surface of the picture plane. She writes of the "rhythm" and "pulse" involved in looking [at a painting] which "in itself, acts against the stability of visual space in a way that is destructive and devolutionary" (p. 51). The threat (or joy) of seeing oneself as other or the other as self is always present in the contemplation of an image, and there is always potential for this recognition to evolve and grow. An everyday and literal example of recognising oneself as self on a surface is that of the mirror; here the function of the surface is designed to offer an honest replica of our own image. However, glass in contemporary architectural design provides a surface for both the still and moving image that invites much more: it invites the gaze. And, as Foucault (2007) writes, "the gaze is never neutral; it gives the impression of leaving things there where they are; [but] in fact, it 'removes' them, virtually detaching them from their depths and layers " (p. 166). Similarly, Elkadi (2006) notes that "we can now look through glass to observe other dimensions of virtual reality" and that as a result of glass technologies "we are on the threshold of creating the architecture of mental images" (p. 82). It is the power of this type of looking and seeing that forms a crucial meeting point between architectural aesthetics and cultures of control in a contemporary society. Elkadi (2006) also points out that an increase in the number of glass skyscrapers in a city's skyline is often taken as a sign of peace and stability; however he later notes that whilst such glass facades apparently offer transformation, any real interaction between people is denied (p. 48). As such, glass has become intrinsic to contemporary interior designed spaces and the language of this space is one of power. Foucault (2007) notes that language has become "a thing of space" (p. 163). This is important for the potential that glass has to communicate in this space because glass becomes part of the language that "keeps watch" (Foucault, 2007, p. 164).

French cultural theorist Baudrillard (2009) points out that aesthetics in a "harmonized interior … is thus not a value of style or of content; it no longer refers to anything but to communication and sign exchange. It is an idealized semiology, or a semiological idealism" (p. 156). Baudrillard reminds us that forms and materials in space are part of the meta-language of a large signifying system. And although Berger (1972) asserts that "We only see what we look at. [And that] To look is an act of choice" (p. 8), things and people that are visible in the designed space of a mental health unit are in a controlled visual environment and don't necessarily have the choice to look or not to look at something, to be seen or not to be seen. To this end Foucault (1995) notes that "visibility is a trap" (p. 200), and here Foucault expands upon the complexities of seeing and watching in a space designed for surveillance.

The environment of the mental health unit is specifically regulatory; it is the placement of "bodies in a meticulous analytical space" (Foucault, 2003, p. 227). One question presented to designers and mental health practitioners is whether to communicate this regulatory aspect through glass, which performs a clearly controlling function, or to disguise the function of surveillance and protection through the transparency of glass? The view that glass is "designing its own disappearance"—as Bell and Kim (2009) suggest—alerts us to the increasing technological advancements, ones that bring about a material which denies itself. The effects of ostensible transparency rendered by glass in an analytical space such as a mental health unit are always already uncanny.

2 Clients is the predominant term used in mental health practice in Australia and thus it is the term we use in this paper. Yet despite this, the majority of the literature still uses the term 'patients'. As such, when we discuss the literature, we adopt the term used by each particular author. Terminology also varies for 'nurses' station' as opposed to 'duty station', and 'clinicians' which is the broad term for all mental health practitioners, as opposed to nurses and doctors.

The unique problems that arise from designing an interior that must at once seem bright and free but also prevent escape (for acute clients) and conform to the many requirements of the health system must at times be discouraging for architects. The popularity of glass and its technological advancement has arguably presented a way to design mental health spaces (such as psychiatric units) that allow for the bridging of these two requirements (i.e. constraint and aesthetic appeal). The design of spaces for mental health, however, presents ongoing challenges because the model of care in most developed countries has moved to one that is community-based. This has meant that the old asylum-style facilities are no longer suitable and architects have to provide a whole new set of solutions to the more varied services such as locked and open wards, short-term stay, and community-based care. Designing anew for these requirements in public health is tied up with government initiatives, architects' reputations in a competitive market, and the politics of healthcare funding systems. There is usually only one chance to get a purpose-built unit right, given that retrofitting is expensive and disruptive to clients. However, despite the importance of design within mental health wards, there is an almost total lack of adequate post occupancy evaluations in this sector (Connellan et al., 2013). Moreover, despite the close relationship between mental health and the design of space and the challenges that it presents, most of the research into this relationship has been published in health journals and is not led by design and communication researchers. Perhaps that is the reason for scant attention to the communicative effects of particular architectural materials such as glass in a mental health unit.

Yet despite this gap in the literature from a design and communication perspective, health researchers continue to examine the real world effects of design upon consumers. Daykin et al. (2008), for example, conducted a systematic review of the literature on "the impact of art, design and environment in mental healthcare" (p. 85). This was a review of over 600 papers published from 1985 to 2005. The study identified a number of recurring environmental features that impacted mental health outcomes. Some of these features include natural conditions and lighting (pp. 88, 91); more physical amenities, and "comfort, privacy and normality" (p. 90). Mental health clients appeared to have more definitive and polarised reactions to their environment than other groups, such as aged care and dementia groups (p. 92).

Two other literature reviews (Ulrich, 2008 and Dobrohotoff Llewellyn-Jones, 2010) open up the breadth of research that is necessary to develop architectural and spatial design in relation to healthcare. Dobrohotoff and Llewellyn-Jones' (2010) study concentrates on psychogeriatric unit (PGU) design and these authors note that the few existing studies on the relationship between mental health and architecture appear to be more generalist and dedicated to dementia patients. In most cases evidence is sought for changes and improvements for clients and clinicians using "old" and "new" designed spaces. Notably, none of these reviews identify glass as a topic that has been given attention in previous research. The most recent literature review on mental health and architecture is the one we published in HERD in 2013 (Connellan et al., 2013) which identifies the following 12 key themes as highlighted in previous literature: Security; Light; Therapeutic milieu; Gardens; Impact of architecture on health outcomes; Interior Design; Psychogeriatric; Post-occupancy evaluations; Nursing stations; Model of Care; Art; Adolescents; Forensic Psychiatric Facilities.

3 Indeed many of the Victorian styled asylums with large grounds are being sold to property developers.

A CASE STUDY OF A PURPOSE-BUILT MENTAL HEALTH UNIT

Description

The buildings that comprise the mental health unit in this case study are part of a large public hospital in South Australia, completed in stages between 2009 and 2010. We selected this building for our study upon the advice of a stakeholder involved in the research project, in response to concern about the appropriateness and efficacy of this building. Furthermore, the building was purpose-built and therefore offered an interesting case study in relation to the design of such spaces.

The unit contains two main wards for clients. The secure or "locked" ward has a total of six beds (all single rooms), three bathrooms, and one accessible bathroom. The open ward contains 20 beds, 10 bathrooms, one disabled bathroom, and one assisted bathroom. Both these wards were typically full throughout our study (as described in the Method section below). Ethical clearance was provided by the University of South Australia's Human Research Ethics Committee and the Ethics Committee of the hospital involved in the study. Procedures regarding information and consent were strictly adhered to.

Method

Ethnography was chosen as the methodology for this study due to the fact that the literature has identified it to be appropriate for use in healthcare settings, and it has been used in previous research in this area (Johansson, Skärsäter, & Danielson, 2006; Savage, 2000). For example, ethnography has been used successfully in psychiatric wards in Europe similar to the one in our study (Johansson, Skärsäter, & Danielson, 2006). Furthermore, ethnographic observations are typically unobtrusive and allow the researcher to develop a flexible approach to both understanding an environment and to gaining insight into the relationships between that environment and the behaviour of the people within it. This study is based on 34 hours of observations during both mornings and afternoons over a ten-week period. To ensure rigour in the consistency of space-use, the time was split evenly between the locked ward and the open ward. Field notes were taken during observations focusing on space usage and movements, and where necessary immediately after leaving the hospital premises.

Once the observations were finalized, the field notes were analyzed using thematic analysis, following the approach laid out by Braun and Clarke (2006). In their paper, Braun and Clarke (2006) provide rigorous guidelines for conducting thematic analysis in qualitative research within the broad study of psychology, and these guidelines were followed in each stage of the analysis of the field note data. Braun and Clarke outline a six-phase guide for identifying, analysing, and reporting patterns (themes) within the data, which includes a non-linear familiarization with the data, coding, theme identification, review, defining/ naming and reporting (p. 87). This approach does not move away from the celebrated flexible nature of thematic analysis but does tighten the approach for more rigour.

Analysis of the entire corpus revealed a number of themes that we have published on. These include (in order of significance): security (Due, Connellan, & Riggs, 2012); the use of the duty station by

both staff and clients (Riggs, Due, & Connellan, 2013); doors and passages; the use of glass in both wards (Connellan, Due, & Riggs, 2011a); the use and effects of gardens and plants (Connellan, Due, & Riggs, 2011b); the choice and positioning of visual art in the wards; and the use of colour (Connellan, 2013). Cultural considerations were something additional that were peripheral but were the subject of a later comparative reflection (Connellan, 2012).

Details

This mental health unit does not disguise itself from the outside. It is highly visible due to clear and obvious signage (Figure 1). It is a facility whose clients are experiencing poor mental health that requires short or longer term stay at the hospital. Whilst in the past mental health facilities have typically hidden or minimised their signage out of concern for the potentially negative effects of stigma upon clients, this assumption did not appear evident in the mental health unit examined for this research, with the unit clearly identifiable through a sign saying "Mental Health." The signage is there for all to see and specifically for those in need to know precisely where to come and ask for support if the occasion demands it. Whilst the reception area is not the admission section, it is a portal of information on mental health services. A senior clinical practice consultant and a member of our research team was instrumental in liaising with the architects to ensure the sign was clear and that it did not disguise/euphemise mental health by (for example) substituting "mental health ward" in the writing on the sign with the name of flower or famous person. Signs for other units in the large hospital of which this mental health unit is a part all have similar signage, meaning that visibility and truth are right up front in terms of the function of the mental health and the function of other units in the hospital. Glass, however, does not play an obvious role in the clarity of the message about the mental health unit. The public entrance to the facility is not encased with glass (despite the large glass sliding doors); instead the laminated walls and grey cantilever canopy shadow the doorway, but this does result in a welcoming entrance. It's a strong beginning but this is not the entrance used to admit mental health clients, as they are brought through an interior (un-glassed) corridor from the main hospital (which is situated behind the mental health unit) and then admitted straight into the ward.

Despite this relatively low-level use of glass in the entrances to the facility, there is extensive use of glass in the interior of both open and locked wards in the unit. Natural light floods into shared eating and entertainment areas, communicating a feeling of lightness and airiness (Figure 2). It is well documented that light, and specifically daylight, is immensely important to the mental health of clients and clinicians (Huffcut & Asid, 2010; Schweitzer et al. 2004; Ulrich et al., 2008). Florence Nightingale was one of the first to insist that the rising and setting of the sun should be absolutely evident to patients and that they should, if possible, have direct sunlight in their ward at all times of the day (Edwards, 2011, p. 155). Ulrich et al.'s 2008 review of literature on evidence-based healthcare design (in non-mental healthcare settings) shows the reduction of stress as a result of daylighting and appropriate lighting. From these findings Ulrich et al. (2008) developed a "restoration theory," which they suggest

> implies that modern humans, as a genetic carryover of evolution, have a capacity to derive stress-reducing responses from certain nature settings and content (e.g. vegetation and water), but have no such disposition toward most built or artefact-dominated environments and materials (e.g. concrete, glass, and metal). (Ulrich et al., 2008, p. 128)

If the stress- reduction responses are specific to elements of nature, then we ask: What is the effect of glass on glass in a mental health unit specifically? In the locked ward of our study, glass offers views of a landscaped garden area that is accessible to those visiting the

Figure 1. Mental Health signage (photograph taken by rst author, 2010).

general hospital outside the mental health unit. In the open ward, views to the garden are accessible within a closed and monitored courtyard on one side but inaccessible on the other side. In other words, glass is there as a literal window to the world outside, whilst simultaneously acting as a constant reminder of the barrier between clients and the outside spaces around them. The following excerpt is from field notes taken by Connellan in the open ward and then in the locked ward.

> *As I sit down at the dining area again I am very aware of the re ections of glass on glass and glass to glass. This causes an ambiguous space and spatial movement. Illusionary.*

Connellan noted the following when taking notes from inside the duty station for the locked ward:

> *I notice re ections on glass quite clearly – especially from a distance. The busyness of the re ections could be distracting.* (see Figure 5)

These reflections create an illusion of people in spaces. In addition, when the glass windows have a combination of objects, features and people behind them in the receding space, there are layers of reflections upon reflections. This creates duplications of overlapping and interpenetrating imagery. And whilst being aesthetically pleasing, such visuality presents a confused sense of who and what is where. It was observed that there were times when the clients seemed to look at the glass for periods of time, and this could have been because of the patterns and movements created within the reflections. In the High Dependency Unit there is a glass panel acting as a divider that drew the attention of the clients, which could be a product of clients being visually entertained by the lively images captured by light and reflection. However, Schweitzer, Gilpin, and Frampton (2004) note that "too much stimulation will have the negative impact of raising anxiety levels" (p. 76).

The use of glass, then, has several purposes. Besides allowing enough natural light to flow into the interiors and to light up the interior, it is also used to facilitate seeing and being seen when necessary. The third author noted the following:

> *I am sitting inside the closed ward in the corner. Two clients are talking to a carer- (senior nurse) – other carer goes off to do the washing. One male client goes away. Female client stays and chats to (reads palm) of senior nurse. One client is lying on a couch / bed with covers, this is full view of the duty station. It's an overcast day but the re ections of glass upon the glass create layered spaces from across the ward eating and living area.*

The duty station forms a central core between the open and locked wards and is encased by glass which looks out onto the wards themselves. The station is the focus of a paper written by these authors (Riggs, Due, & Connellan, 2013). The glass window of the duty station in the locked ward is fixed and cannot open whilst there are two sections of glass that can slide up in the open ward. The staff in the duty station of the open ward are more visible than staff in the locked ward section of the duty station, both due to the larger amount of glass and the fact that the duty station itself is bigger in the open ward. However, this increased visibility may also be because the open ward itself is larger and with the emphasis upon glass all spaces are well lit thus increasing the light across to the duty station. However, during our study, in addition to the bright surrounding natural light, the open ward interior electric lights were all on in the duty station, thus lighting up the station even more and also creating more reflections. The ethnographic note below (Connellan) is written from outside of the duty station in the open ward (i.e. a client's view), indicating how far across the ward reflections appear in the glass (Figures 3,4 and 5).

Figure 2. Open ward dining and recreation area (photograph taken by rst author, 2010).

The duty station appears lit up and it re ects and is re ected upon other re ections. e.g. trees and brick wall from the outdoor area. Re ections also change with the light on all the glass panels.

The adjoining locked ward duty station is smaller and darker, electric lights do not always seem to be turned on or be as effective in this station. The darker duty station thus becomes less visible which inadvertently communicates inaccessibility from the outside. It is easier to see out of the locked ward duty station than it is to see into it because one is looking from dark into light (Figure 5).

INSIDE/OUTSIDE

When the above aspects of seeing and being seen are considered in an environment that is dependent upon power relationships between the role of client and the role of clinician, it is most likely that the extensive use of interior glass is worked into the design as a security measure for all. Increased visibility is often regarded as providing greater safety for occupants of interior space. As mentioned, the centralised duty station is glass-encased and the glass allows vision both out and in. There are no computer-controlled false windows that mimic scenes or scenery (Biley, 1996) and no one-way glass

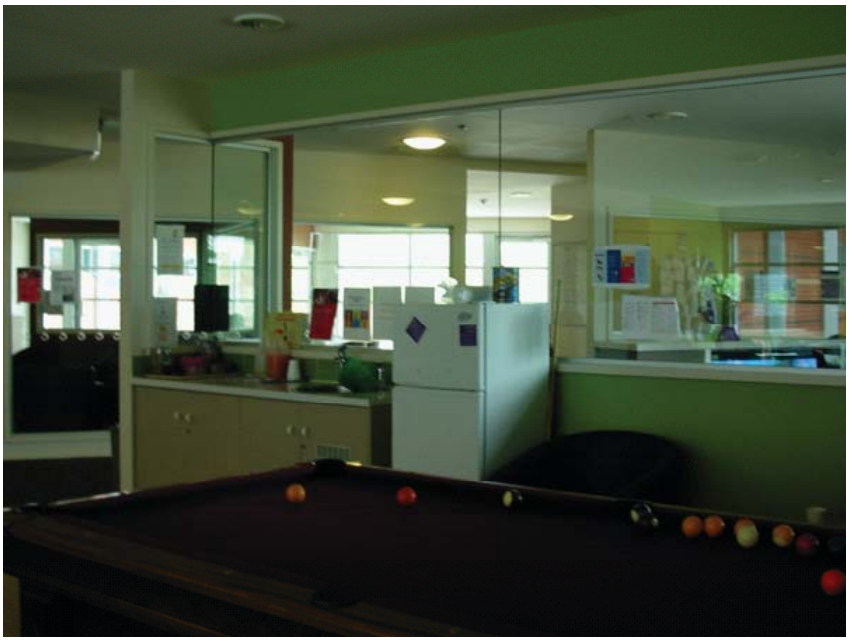

Figure 3. View from inside the open ward, showing the re ection of the duty station (Photograph taken by the rst author, 2010).

Figure 4. View through locked ward eating and recreation area (Photograph taken by the rst author, 2010).

interior panels (also sometimes referred to as mirror glass) anywhere in either unit. The reason for the absence of one-way glass may be that there is sufficient security through the use of the ceiling-fitted convex directional mirrors (Figure 6) and the numerous security cameras, also ceiling-fitted. On the surface it would appear that the use of glass is therefore an open approach to communication with the glass hiding no one nor deliberately suggesting something that is not there.

Yet, the third author, sitting in the locked ward duty station, noted the following:

> *One male client wanders back up corridor and punches glass wall at end and nurse goes out to have conversation with him and then takes him outside with his smokes.*

The above extract is salient in terms of the glass in this instance forming a barrier, but also a surface upon which to vent frustrations upon. Therefore whilst security and safety are optimal in any mental health unit, clients also need to know they are safe from harming themselves. The third author noted that clients wandered around the locked ward a lot. Below is one excerpt from the third author's ethnographic notes:

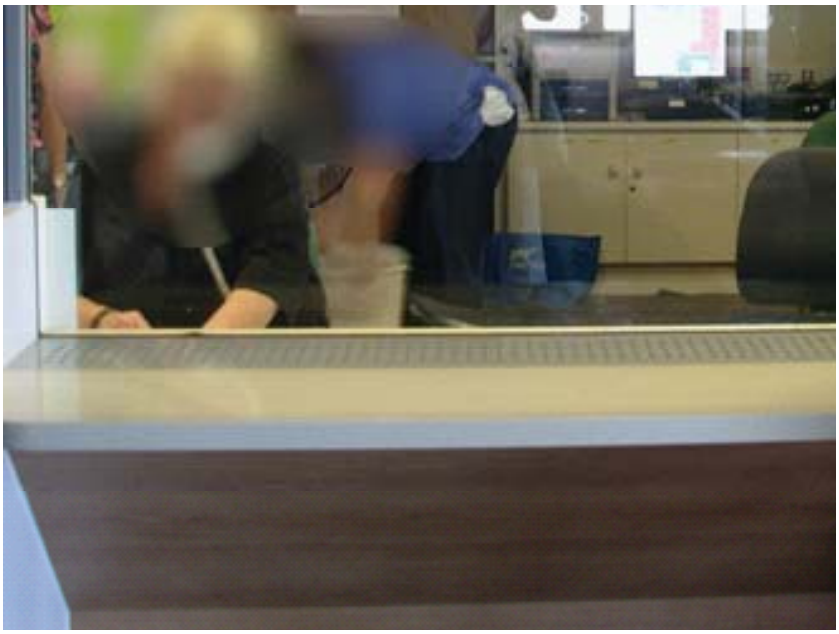

Figure 5. From inside the locked ward duty station, (Photograph taken by the rst author, 2010).

Figure 6. Convex directional mirror. (Photograph taken by the rst author, 2010).

> *S walks down corridor and goes into bedroom or toilet. J gets up and walks around dividing glass panel, then back to TV room, then back around again – holding his drink. He does this several times.*

The pacing and wandering may have more to do with the clients' mental condition than with the glass, but it is nonetheless important to consider the effects that glass might have upon the movements of clients. Glass can give the appearance of openness but it can also provide a perceptible transparent barrier to close physical communication. As such it is used to separate people from people. Stichler (2008) makes five recommendations, two of which focus upon security:

> For the staff, designs should address (1) the work flow process of care giving and minimize the steps necessary to secure supplies and equipment; (2) safety features that reduce employee injuries resulting from repetitive movement, patient lifting, mobilization, and transfers; (3) visual access of patients from nursing stations or documentation alcoves; (4) security designs that enhance protection of the staff from hostile visitors; and (5) staff stress reduction with the design of respite rooms (quiet, meditative environments) in high-stress areas (Stichler, 2008, p. 507).

With (3) and (4) above in mind, it is likely that the glass is used to counter any unsolicited contact and we fully acknowledge that protection is extremely important in any stress filled environment. The question remains, though, as to how much glass is too much?

The structural feature of the sliding window in the open ward duty station of our study is a point of closer communication. The third author noted the following:

> *In this ward the nurses' station has a window which lifts up, and clients can lift it up too. This window appears to be a more central part of communication than the door(s) although clients appear to come up to the nurses' station much less in this ward than in the locked one.*

Our study also revealed that clients in the locked ward preferred to knock on the door (not made of glass, but with a small glass panel at head-height) of the duty station and have it opened by a staff member, rather than to converse through the closed glass of the window. See ethnographic excerpt from the third author below:

> *I notice that sometimes when a client comes to the door to the nurses' station other people come and hang around too, other times they just ignore what is going on.*

Overall the door to the nurses' station in the locked ward appears to be a central part of interaction between staff and clients—also worth noting that it is the door and not the window. People rarely seem to go to the window in the locked ward.

It is also significant that whilst staff could open the door to the clients, they could also ask them to go around to the window. At this opened door staff frequently stood and chatted to clients, and clients rarely tried to touch a member of staff. Importantly, if a client did try to point at something in the duty station—thereby putting their arm into the room a bit—they were frequently asked to step back by staff. As such, whilst the door in the locked ward was not designed as a point of contact (it was located out of the way, around the side of the duty station), it did offer more physical communication than the glass window. Staff allocated to the locked ward generally returned to their tasks within the duty station after interacting at the door. However, the observations also indicated that staff spent what time they could sitting and chatting with clients inside the locked ward, suggesting that they felt some degree of safety in this space. This may have been facilitated by the fact that all staff members had alarms and swipe/key cards to open doors hanging around their necks at all times.

Schweitzer et al. (2004) write that, "Centrally located nursing stations and glass partitions may limit patients' access to staff" (pp. 78-79). We suggest that the use of glass as a signifier of simultaneous communication and security may be disingenuous to clients and visitors and similarly these mixed messages might also affect the behaviour of the staff. Schweitzer et al. (2004) also note

> it is not uncommon to find large centralized nursing stations on a typical patient unit, set apart from patients by half-walls or glass partitions and at significant distances from most patient rooms. These elements clearly distance staff members from patients, sending the message that they are busy and inaccessible (p. 78).

Schweitzer et al. (2004), Gross et al. (1998), and Karlin and Zeiss (2006) all recommend the use of open, non-glassed or partitioned duty stations. Messages are sent visually more often than verbally, and therefore the role of glass as a visual communicator needs to be taken more seriously. For example, Berger (1972) writes

> We never look at just one thing, we are always looking at the relation between things and ourselves. ... Soon after we can see, we are aware that we can also be seen. ... The reciprocal nature of vision is more fundamental than that of spoken dialogue (p. 9).

With the above considerations of being inside and/or outside with glass used as a spatial and psychological boundary, and the means of communicating security and safety in an honestly visible way, we move to our conclusions on where truth sits between reflection and rationality in a glassed in interior.

CONCLUSIONS: GLASS TRUTHS

We began this paper by situating glass in its architectural history and moved to considerations of cross-disciplinary theory on the crucial issues of visibility and security. The title of the paper, "Light Lies: How Glass Speaks," posits a duplicity based on the transience of light and the transparencies of glass. But lies are not always intentional and truths are rarely singular, which is why glass sits at the cusp of reflection and reason, of ambiguity and structure. Glass was always going to be a substance that conjured up the artificial; it is artifice itself. Since its ancient inception, it could pretend to be a jewel that it was not (Whitehouse, 2011) and very soon it could create an environment that it was not. This was most useful for horticulture but then it became useful for people too. Glass truths will always be as fragile as their surface and as permanent as the engineered properties of that glass. The billions of crushed shells and stones that constitute the particles at the heart of this substance each have their own story, their own truth.

Glass is no longer a singular material but a highly complex one that can be engineered to perform more complex tasks than being a lightweight building material and a conduit of sunlight. As architects and designers we should not be seduced by the properties of beauty, as health practitioners we should not undermine their propensity to heal, and as communicators we should be aware

that ambiguous messages—whilst captivating in glass—are often dangerously misleading. Achieving a balance requires a rational blending of aesthetics and functionality.

Aesthetically, glass can speak beyond the visible and communicate its qualities with potent auditory capacity. For example, one crystal glass tapped lightly against another will ring out as a pure stream of sound. Alternatively, the same crystal glasses dropped onto a hard tiled floor will shatter with sharp splintering sounds. So, too, will an unstable unreinforced glass panel shatter and, depending on its weight and height, its crash could be loud and fatal. There is a danger in glass that may be part its allure; it is sharp enough to sever arteries and its reflective qualities can light a terrifying bush fire.

Glass, in Baudrillardian terms, contributes to the simulacra of the everyday world outside the mental health institution. Its busy duplications are disconcerting for the "normal" individual. The question that must be asked, then, is whether glass is responsible for replicating the seductive qualities of aesthetic reflections (play of light and the ambiguous imagery) in an environment of heightened emotional responses to all sorts of stimuli? Questions such as this cannot be answered simply on the basis on one ethnographic observational study, and as such more targeted empirical studies need to be done to measure the effects of particular materials in mental health units. Nonetheless, the present study gives some preliminary support for the assertion that glass does indeed play a role, both in terms of visibility and security, potentially with adverse effects.

It is clear from existing studies and specifically the work of Ulrich (1991; 2000; 2001) that natural light is essential to healing. In terms of our findings and observations relating to the use of glass, we do not recommend a reduction in natural light but rather encourage alternative methods of capturing natural light—for example, through skylights. At this point, based on the observations we conducted, we recommend that glass is not used for interior partitions unless those partitions are absolutely necessary, and then such glass should be non-reflective. For example, the duty station might not require any partition above the counter if the station is used for client and clinician relationships and if administration is done elsewhere (Riggs et al., 2013). We advise against reflective glass in all light-filled areas that result in deceptive imagery that might be understood as real. We also suggest that if glass is for looking through and seeing the other side at a natural height, (excluding clerestory windows of the sky), then that other side should be accessible to the viewer. Windows wherever possible should be able to be opened; if glass is not meant to be seen through, it should be opaque. In other words, glass should not be a reminder of a lack of freedom.

The mental health unit is a highly regulated environment, and glass as an architectural material is also subject to stringent regulations. Its wonderful qualities of emitting natural light have not lost the magic of the middle ages when darkened interiors were turned to light and the liturgy in churches was persuaded to move from hell and damnation to heaven and salvation (Torevell, 2007, p. 72). Light as lumen must remain, but glass should not be the vehicle of duplicity. Let it continue to be a material of hope.

Glass is discussed in this paper as a medium for communication. And this communication would be expected to be supportive and clear in the context of desired mental health outcomes. Glass has been shown to flood the interiors with light, to bring moving imagery and reflective visual patterns that communicate a liveliness but also an ambiguous reality. Glass can therefore miscommunicate, beguile, and tease. The various glass structures included in the architectural design of this purpose-built unit—such as windows, panels, dividers, and doors—are part of the language of this particular mental health architecture. It is a well-meaning language that sets out to lift the spirits of the clients and clinicians with the poetry of light, but it may be that a more prosaic approach that still incorporates light and glass would be more effective and result in more honest communication than the proliferation of layered visual meanings.

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