Picture composition applied to
3-dimensional level design

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Abstract

The purpose of this thesis is to examine how compositional techniques developed for fine art may be applied to 3-dimensional level design. It uses game design theory and best practices as a starting point and then investigates how graphic theory can be applied to further them by creating natural graphic focal points in a level, providing a set of tools the designer might use to graphically communicate with the player. The thesis investigates four main techniques used to achieve graphic control:

Managing hues and values.

Managing shapes.

Using linear and atmospheric perspective.

Managing levels of detail.

Each technique is linked to compositional theory through historical paintings which feature the techniques in question. Examples are then provided from contemporary games that testify the validity of using the technique in level design. In some cases altered scenes are also provided; over paints done in Adobe Photoshop exemplify how a technique may be used to change a scene’s meaning and convey other messages to the player. The conclusions and analysis testify to the value of incorporating compositional theory into level design and suggest further areas of research along the same line.
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1 Introduction

The theories concerning the composition of pictures are as old as art itself and are of paramount importance to any artist for the help they offer in the quest to communicate a piece’s intentions in a lucid way. As any student of art would know, it is critical to ask oneself what to include and what to leave out of a picture’s frame. How should the elements chosen to remain then be arranged? What is their purpose and how can the artists achieve control over what they are communicating to her viewers?

Scott Mcloud describes an artist’s journey towards mastery in his work Understanding Comics as a six step process where the artist works inwards from a piece’s surface towards its core; the idea the piece is meant to convey to the viewer. In these six steps he highlights the structure as the fourth area; the learning artist tends to focus on it directly after having grasped her craft (Mcloud 1990:170). Craft here refers to the creation of the elements of any piece, structure to the ordering of these elements in such a way that the artist’s intentions become as clear as she desires them to be. This is the very essence and purpose of composition; “…the arrangement and application of the elements and principles of art” (Sandberg 2007: 50).

To order a picture’s elements usually refers to just that; to create an ordered experience where the picture’s elements strive together to carry the intentions of the artist’s mind to the viewer’s eye rather than competing for attention between themselves. This entails establishing a visual hierarchy where some elements naturally assume a subordinate position to others. This order is absolutely critical to the legibility of the piece; the artist must be able to manage contrast in such a way that she is able to direct the viewer’s eye and explain the relationship between the elements, communicating the picture’s essence to the viewer. Should she fail in this the result would be visual chaos; at worst, the viewer would perceive no discernible pattern between her elements and the picture’s meaning would be lost. Of course, a great many artists are not so concerned with lucid communication of specific ideas, preferring to produce works that give rise to great variety in interpretation instead. As an artist’s ambition with a particular piece goes from general to specific, however, the requirement of legibility increases.

The need to compose graphical elements so that they serve the purpose of the artist’s vision has been a recognized necessity in pictorial art since antiquity. As new media have been invented this need has been recognized and tackled by their practitioners: photography and motion picture are both examples of media that at their genesis were seen as little more than means of recording the natural world, but as the artists dedicated to them matured the medias’ innate potential as channels for artistic expression became clear through their work. Today photography and motion picture are both universally recognized as outlets for artistic creativity and works created in them are subjected to critique based on the artist’s vision and the clarity of how it is presented.

Such universal recognition is not yet extended towards the medium of video games, however, even though some noteworthy examples of the medium have been lauded for their high level of artistic realization. Bioshock is a good example amongst others such games, it is referenced for its qualities by Smith and Worch in What Happened here (Smith, Worch, 2010: 7), and also by Rouse in his talk on environmental narrative (Rouse, 2010: 33-37). The question of whether or not games should be seen as tools subtle enough to convey emotions and ideas as
effectively and on the same level as previously established media remains open; at least outside the ranks of the medium’s advocates.

This lack of recognition carries through to an extent even into the development process, it would seem; it can still be said with some confidence that it is industry norm that as the budget devoted to the creation of graphic assets increases, developers nearly always favor quantity before creating a more tightly designed experience for the player. Thus high end games tend to have more details per scene, rather than more expertly placed detailing, larger and more detailed scenery rather than more evocative scenery, more and longer levels rather than levels that more effectively communicate the designer’s vision etc… Graphics are in this regard still often viewed as a bulk-commodity; its qualities are said to have improved as the quantity available increases. Great artistic control is, while much appreciated when present, far from mandatory.

In 3-dimensional games the strive towards photo-realism can still very much be felt and is still, to an extent at least, regarded as a purpose in itself. As has been the case since the advent of 3-dimensional games that require the player to move about in an environment, better graphics still very much means graphics that more closely resemble reality. This is of course unique to games; in no other field of visual art would subject matter authenticity be more highly regarded than graphic control. The technicalities of how the worlds are created still holds precedence over why they should be created in the first place; what they are meant to convey to the player.

This state of affairs will not last, of course. Already there is a growing realization that as the goal of photo-realism draws nearer new paths must be chosen. Designers are already in the process of exploring visual styles new to 3D-games and are learning how to use graphics to convey meaning with greater subtlety all the time. This is the subject of this thesis; it explores the ways graphic control can be achieved in level design using techniques already established within other visual arts.
2 Theory

Since games are comprised of several converging media this thesis cannot solely deal with graphic theory; considerations must be also be made regarding some elemental principles of game design:

This thesis is largely based on the assumption that the player prefers to be aware of the short term goals she strives towards in any situation, otherwise it would be impossible for her to formulate meaningful strategies and she would have no way to quantify the result of her efforts (Adam, Rollings 2007: 401), though it should be noted that the information transmitted through the techniques investigated here do not need to be restricted in any special way. For example, the information does not need to be of the kind that is helpful to the player; designers might choose to be deceptive, at their discretion.

It is also worth taking into account that games by their nature limit the number of actions available to the player, which along with the game space, or level, establishes the limits of her strategies. Since the player is aware of the limits of the actions she is able to perform she will to an extent automatically grasp the hierarchy of elements within the game space. For example, in a game such as Mirror’s Edge where the goal is to traverse a course set along the rooftops of a major city, the player understands that the protagonist is able to jump only so far, thus the skyscrapers seen alongside the course is of no importance other than in establishing the setting, she cannot reach them. However, this thesis works under the assumption that this hierarchy of importance and unimportance should not be established solely by the limitations of the game mechanics; the player will also take into account the graphic ordering of the level and this should be seen as an opportunity to be exploited by the designer. Game environments should do more than merely designate the limits of the players’ movements.

Since games by their nature impose strict limitations on the number of actions available to the player at any given time through their mechanics or rules, the player will always be faced with a likewise limited array of choices for how to overcome the challenge at hand. The player will of course be aware of this (otherwise the game has done a poor job of teaching its mechanics) and will constantly be on the lookout for places in the levels where she can use her allowed actions to achieve an effect to her advantage. This makes clear graphic focal points very useful; if a player recognizes an area of a scene as being of particular importance, she is likely to be tempted to consider the actions she might be able to perform there. This relationship can be further encouraged by a skillful designer trough repetition.

The visuals make up only a part of the media converging in games to create the player’s experience; the player’s experience is also governed by the limitations of the game mechanics, the audio and the control system, to mention some. Thus game graphics cannot be designed as standalone entities; their quality must first and foremost be evaluated based on how they interweave with the other elements offered the player. Should the graphics convey information that the game cannot back up through its mechanics for example, misunderstanding and chaos would ensue. With this in mind, other reasons for considering graphic focal points as a way of transmitting information to the player becomes evident: A scene may employ focal points to clearly denote where the game mechanics may be applied. Focal points may be used to direct the player’s eye towards where the goal or path towards the goal lies or where in the background clues to the game’s narrative might be
found. If level graphics are ordered with the creation of focal points in mind the graphic hierarchy which is the hallmark of an ordered scene may be established relatively easily. Even a scene executed in a style close to reality, with all the details created by the grit and texture reality entails, may be ordered in this way so that elements unimportant to the player assume a subordinate role to those in the focal point. These elements will then add to the atmosphere of the world without decreasing the legibility of the level. Not that focal points need to be restricted to be used only to bring order to realistically styled games, their utility is evident regardless of stylization.

So even though clear focal points are by no means mandatory for an interesting, legible graphic composition, this thesis will primarily deal with their creation because of their great utility in creating graphics in the service of level design.

Through this outlook, the goal of designing the graphics for the sceneries the player moves through shifts from simply creating an as large as possible quantity of ornaments to providing a unified whole which invites the player to form her own interpretation of her surroundings, thus activating her as a narrative device in herself. In their GDC-talk *What happened here* Matthias Worch and Harvey Smith explain the latent power of allowing the player to form her own opinions and conclusions of her surroundings rather than explicitly stating them to her through exposition. They called this art of communicating with the player through suggestive environments *Environmental Storytelling*: “Environmental storytelling fundamentally integrates player perception and active problem solving, which builds investment.” (Smith, Worch, 2010: 26)

Environmental storytelling relies heavily on the *Law of closure*; it states that human beings will attempt to fit visual elements they are exposed to into larger frameworks by drawing conclusions, formulating holistic ideas from parts. (Smith, Worch, 2010: 36). The stimulating and activating qualities that come with designing with the Law of closure in mind are undeniably important to consider while creating an immersive setting capable of inducing what is often called willing suspense of disbelief.
3 Purpose

The primary purpose of this thesis is to provide an answer to the following question:

Is it possible to use compositional techniques developed for fine art and photography to increase the legibility of 3-dimensional level design?

As stated in the theory-section, this specifically concerns techniques used in order to create clearly defined focal points within a scene. Techniques being investigated here are the following:

The arrangement of values and hues to make the desired focal point stand out in contrast towards its surroundings.

The arrangement and design of shapes so that they point towards the focal point, frame it or themselves become the focal point through their contrast in graphic activity relative to their surroundings.

The use of linear and atmospheric perspective to pull the viewer’s eyes towards a desired point and manage the level of detail and scope of a scene so that the area of interest can be narrowed down.

Using contrast between levels of detail in parts of the environment to create contrast which attracts the viewer’s eye.

One important implication of communicating with the player through the law of closure must be taken into account: since the idea of using the law of closure is to increase the player’s immersion in a narrating environment, this thesis deals specifically with graphics that have been created for such a setting, one that is intended to provide the player with an illusion of a holism to be immersed in, a world. A game’s level/levels could after all merely provide the playing space in which an activity takes place, similar to for example a football field or a tennis court, neither of which provides narrative context to the players.

Since this work is concerned with level design specifically, it will not take into account composing by limiting the player’s vantage point through a restricted camera, but only the ordering of the environment; for the sake of this purpose it focuses on free camera games.

The underlying purpose of all this is of course to further establish compositional theory of fine art as a source of knowledge on graphic control. Level designers and the artists they work alongside can draw from this knowledge in order to increase their abilities to communicate with their players; thus furthering the cause of establishing video games as a recognized medium of art.
4 Method and materials

In order to find support for the usage of compositional theory in level design, several contemporary free camera games have been investigated for instances where it can successfully be used to explain why a certain area of the scene becomes a natural focal point. A description on how the theories have been applied for each example is provided, anchoring the method of achieving graphic control in compositional theory. At the start of each section of the result chapter the techniques being investigated are discussed, along with an example piece from art history for demonstration. The games that have been subjected to investigation are:

**Portal II** (Valve Software 2011)

**Half-Life 2** (Valve Software 2004)

**Mirror’s Edge** (Dice, Electronic Arts 2008)

**Batman: Arkham City** (Rocksteady Studios, Warner Bros. Interactive 2011)

**Bioshock** (Irrational Games, 2K games 2008)

In addition, as an example of how developers may use compositional theory practically, scenes from **Quake II** (Id Software, Activision, 1997) have been provided and altered through over-paints in Adobe Photoshop CS4 to incorporate the previously described techniques, improving or altering their meaning. In these cases pictures of before and after have been provided along with a description detailing the changes made and their impact on the scene.

When Quake 2 (or any similar game from its era in time) is juxtaposed against more modern games with player controlled camera it testifies to the progress in the field of graphic control that has indeed been made in the intervening time. The more recent games are provided in order to give usable examples of how the techniques have been implemented; Quake 2 serves as a blank slate where they can be tested.
5 Previous research

To the author’s knowledge no academic works have been published that specifically attempt to make use of traditional compositional theory in level design at the moment of writing (September 2012). However, there are several instances where different authorities of level design touch upon the subject in their works:

Matthias Worch and Harvey Smith explain the great benefits of using the game world as an active storyteller in their lecture What happened here, but focus on how separate elements are being tied together by the players to form conclusions rather than on how to achieve graphic control over specific scenes (Smith, Worch 2010).

Richard Rouse III’s lecture Environmental Narrative: Your World is Your Story does mention methods of focusing the players’ attention by graphic control, but do not go into these in great depth. For example, Rouse mentions the need for setting up scenes in level design as a film director set up shots; planning reveals and using the environment as a framing device. He also touches on the possibility of using movement and sharply contrasting lights to direct the player’s attention (Rouse, 2010: 33-37).

In their book Fundamentals of Game Design Ernest Adams and Andrew Rollings state that a level designer actually performs the duties equivalent to those of several positions in filmmaking, all of which involves composition to an extent. They do not however specifically mention methods of graphic control (Adams & Rollings 2007: 401).
6 Results

The different results will be listed below. Each technique of picture control has been given its own chapter and each investigated game their own subsection.
6.1 Picture control through limitations in hues and values

Different hues and values possess the innate quality of contrasting with each other. If these contrasts are properly ordered they may be used to give meaning to a scene. If they are altered, so is the scene’s meaning.

Fig. 1, Source: wikipaintings.org

In *Philemon and Baucis*, Rembrandt limited his value range in order to make his characters read as centers of interest. The greater part of the picture is dark in value, which leaves the brightly lit characters clearly contrasted against their surroundings. When values are ordered like this, as clearly defined light areas like islands in a sea of darkness, it is possible to consider the darker parts of the picture as a dark matrix. The matrix is a binding structure which keeps the elements of interest together in a similar way that mortar holds the bricks of a wall in place. (Graham 1970: 120) The dark areas express low visual activity, allowing the viewer’s eye to move between them without being interrupted.

Games may use this clear division of surroundings versus centers of interest to communicate the important areas of a scene to the player. In this way even a very detailed scene, like Rembrandt’s painting, may have a clear sense of purpose. The true beauty of this technique is that the player may register this order or hierarchy intuitively, reducing the need to explaining
scenes through exposition and allowing her to form her own conclusions of the world. This goes for all the techniques this work deals with.
6.1.1 Batman: Arkham City

This screenshot, taken from a scene in Rocksteady’s *Batman: Arkham City*, clearly demonstrates the implementation of several compositional techniques related to hue and value control. This scene has three exits, one of which serves as the player’s vantage point in the picture. The designer has distributed the values and hues in a way that suggest their location to the player.

A limited value range has been very clearly chosen at the dark end of the range of available tones, an analysis in Photoshop CS4 reveals that only in small areas does the picture’s whiteness exceed 30%. The color palette is equally restricted and is dominated by relatively desaturated blues and greens. Through this restriction of values and hues a dark matrix is established (Graham 1970: 120). As focal points the designer has placed light sources which clearly designate the points of exit. Since the matrix contrasts so clearly with the focal points and the rich detailing of the scene has been subordinated by it, the high level of detail does not decrease the scene’s legibility. There is in fact scarcely the tiniest noise free area in the entire scene, yet the designer’s intentions remain clear. It is also worth mentioning that the level of graphic noise has been further controlled by implementing atmospheric perspective and some depth of field effects, most noticeable around the verticals surrounding the right focal point. Even though the game’s visual style puts heavy emphasis on faithfully depicting subject matter, the underlying structure of the scene is not lost to the player.

The effect of the arrangement of hues and values within the picture may be further visualized by displaying them separately from subject matter as in this picture:
Here, a Gaussian blur of ten pixels width have been applied to the original picture in order to somewhat reduce its level of detail. The picture has then been stretched vertically from its middle until all horizontal movement was lost. The two warm bright lines of the focal points clearly stand out from the rest of the picture area. The effect becomes even clearer when this image is superimposed over the original as an overlay, 100% opacity:
Uniform vertical stretching is employed in this example to help visualize the great emphasis on the scene’s focal points by creating clearly defined vertical bars that reduce the picture’s apparent level of detail and thus makes the lighting stand out clearer. It should be noted, however, that it is only possible to use this technique since the focal points are located close to the horizontal middle of the picture, otherwise they would have been lost in the stretching process because it only preserves information located close to the middle of the stretching motion. The bars seen in the examples above are therefore simplifications of the elements present only along the horizontal middle line running through the picture. For this reason this technique could not be applied to any other example. However, the limitation lies within the technique of visualization, not within the picture composition itself; it is very much possible (as seen below) to place clearly legible focal points at a distance from a picture’s horizontal centerline.
6.1.2 Portal 2

One game that does place heavy emphasis on vertical movement is Valve’s *Portal 2*. In *Portal 2*, the player must navigate through several laboratory-like test chambers by using a device that creates portals on certain surfaces; the player may travel through these portals with conserved momentum in order to traverse the levels. Since not every surface is compatible with portals, those that are must be defined somehow. Valve does this by value control through lighting:

![Portal 2 game screenshot](image)

**Fig. 5, Source: Valve Software**

Notice that all screenshots from *Portal 2* feature the interface device of the blue and orange aiming reticule and also the portal gun in the player’s hands, seen in the picture’s bottom right corner. These exist independently of the player’s surroundings and will be considered as not part of the level design. The two white surfaces here are both compatible with the player’s portal device. This has been established early in the game, but Valve also relies heavily on the placement of light sources in order to define them; this is a recurring theme throughout the game. Below is the same scene with portals attached to the walls:
Through this simple restriction in values order may be brought to scenes stretching across vast areas as seen in the following pictures:

Fig. 6, Source: Valve Software

Fig. 7, Source: Valve Software
It should be noted that considerable effort is spent teaching the player the relationship between lights and points of interest, but once it is established it is registered almost on a subliminal level.
6.1.3 Quake 2

This simple scene from Quake II provides a good example of how a scene’s lighting may be composed in order to add to or alter its expression; here is how it appears in the original game:

Fig. 8, Source: Id Software, Activision

As with Portal 2, the presence of the player’s handgun will not be discussed as being part of the investigated scenes. As the player enters a small storage compartment, the door promptly closes behind her. With no immediate way of opening it, she is forced to explore the room. A logical first move would be to pick up the resources she sees at the far end of the room from her vantage point in the doorway. Unawares to her, the designer has planned this room as the big reveal of a powerful new enemy character, the tank:
Fig. 9, Source: Id Software, Activision

The tank is obscured from the player’s vision by a makeshift wall of some crates as she enters the room; the door on the picture’s left is the player’s entry point. The tank has been staged as if working on a computer terminal which also acts the button that opens the door. If the player walks into his line of sight he will engage her, his line of sight extends in a 360 degrees circle around him. This scene is summarized with the following plan:
This plan of the scene explains the player’s field of view from her position in the image on page 17, the screenshot on page 18 is a reverse shot of this one. The green circle represents the player and the red the enemy’s position as the player enters the storage room. Dark boxes are crates, small circles powerups and the blue block stands for the computer terminal. The color-fields represent the player’s line of sight (green) and the area which will cause the enemy to start his attack, should the player enter it (red).

It is obvious that the main event in this scene is the reveal of the tank; the room is set up as an ambush in which the powerups in the top left corner could be said to act as bait for the player. Their location ensures that the player has a valid reason to stumble into the monster’s line of sight. However, there are two stashes of powerups within the player’s sight, so her attention might likewise be divided. The lighting of the following picture has been altered to emphasis this division between two natural focal points:
This is of course a valid way of setting up the scene. Since the door is locked, the player will always be forced into a confrontation with the tank, fulfilling the scene’s purpose. However, it is likely that a significant number of players will choose to visit the right side stash of resources before the left. In order to maximize the shock value of the tank’s reveal, the designer might want the players to go directly for the left; most would have their eyes on their immediate goal and would have their back to the tank as he attacks. Experienced players might also be rewarded by a reduction of the enemy’s advantage of surprise if they have learned to check their corners and are walking backwards, adding an additional element of skill to this scene. To increase the chance of players choosing the left stash first, the designer might choose to remove the right light:
In this setup, there can be little doubt of where the center of interest lies! No matter what the player chooses to do, she could hardly miss the left stash now. With the center of interest so clearly undivided, the meaning of the scene shifts slightly; the player may feel that someone clearly intends for her to take interest in the objects of the far left corner. Since there is nothing in the established game mechanics that would cause the objects in the light’s cone to be interpreted as narratively significant, the player should recognize them as ordinary machine gun ammunition, it is not unlikely that she may start to sense the nature of the trap she is about to walk into. If the designer wishes, he could reinforce this feeling by altering the scene’s lighting again, this time by hinting at an unseen space behind the crates:
In this final proposal for the storage room’s lighting, a red light as been added behind the crates to the player’s left, spilling out between them. This is intended to put emphasis on the area behind them, communicating to the player that there is something of interest there. Some players might perceive the red light’s coloration as a signal of warning. Through the law of closure, players will take the tank’s area into account as they move towards the stash of resources; some might even regard it suspiciously now that they feel there is something else in the room unseen; suspense is built. Coming around the corner players will be rewarded through their successful application of closure by the enemy’s reveal. In this way the designer entices the player to take an active interest in her environment, he feeds her scraps of information she will process through the law of closure, making her experience more involved and richer.

In this instance, it is not out of place to regard the red light as foil to the focal point of the resource stash. In classical compositional theory, a foil is intended to pull the viewer’s interest into the scene before it is captured by the focal point (Graham 1970: 306). If this reasoning is stretched, the lights and resources in the previous setups might be considered as foil to the **dramatic focal point** of the entire scene; the reveal. This is of course not a valid way of using the term, strictly speaking, and is concerned with dramatic pacing in addition to graphic
composition. However, the example should be considered as a new way in which level designers might draw inspiration from compositional theory.
6.2 Picture control through the arrangement and design of shapes

Fig. 14, Source: Freer and Sackler Galleries: The Smithsonian’s Museums of Asian Art

This is *Boy viewing Mt. Fuji* by Katsushika Hokusai. The different kinds of shapes Hokusai used in this landscape are of the same kind as level designers might employ when they set up their scenes. Set against the simple and easily read shape of Mount Fuji the much more active boy becomes the clear center of interest. The boy is also situated on the tree’s trunk which both works as a divider and as a guide to lead the viewer’s eye. Since the trunk bisects the image, the viewer eye is forced to cross its path and is likely to be led across its length; it creates a progressive force. As the viewer travels across its length her eyes will again register the boy as a logical focal point, the boy being clearly of a different kind than the tree.

Shapes may be either progressive or dispersive, emphasizing their command over an area of the picture rather than leading the viewer’s eye onwards through the picture or scene (Graham 1970: 69). Shapes may also contrast in their level of activity, which may be exploited in order to draw attention to them or reduce their importance in a picture (Graham 1970: 45). All these qualities may be used by the designer to contrast different elements of a scene to communicate its meaning to the player.
6.2.1 Bioshock

In this scene from Irrational’s Bioshock the possibility of putting emphasis on focal points through shape control becomes obvious:

Fig. 15, Source: Irrational Games, 2K games

There are two major centers of interest in this picture; the neon party sign and the poster behind the counter, both of which suggest narrative information that helps the player understand her situation. The poster in particular is interesting because of how it has been arranged in relation to its surroundings. Since the immediate area surrounding it, the two paths going around the counter, is mirrored they read to the player as being equally important. This equality causes any graphic movement between them to be cancelled out, leaving the attention of the player free to return to the poster (Graham 1970: 284). This is an example of how the environment may be used to emphasis focal points through framing, drawing on the dispersive qualities of the shapes surrounding the poster to define the area. The poster itself is hung slightly askew. This does not only hint at the general state of the area, but also increases its contrast in activity in relation to the stricter verticals in the rigid shapes flanking it.
6.2.2 Half-Life 2

Valve’s Half-Life 2 contains a good example of how a scene may be ordered using contrasting activity of shapes. Again, the interface devices and player model are not part of the investigation:

Fig. 16, Source: Valve Software

In this level the player is leading a charge against the prison, *Nova Prospect*. The player must traverse a long beach littered with enemy bunkers and *thumpers*; giant hammers striking the ground perpetually designed to repulse the insectoid creatures the player controls. In the picture above a bunker is seen to left and in front of a thumper, partially obscured by the rock formation to the right. Notice also the very active shape of the driftwood in the foreground competing for interest, slightly detracting from the impact of the structures. The graphic designers have spent some effort in creating a uniform design for the game’s enemy, the *Combine*, featuring sharp, angular and broken shapes built around the themes of mass production and asymmetry (Valve Corporation 2004: 183). The bunker’s antenna array and the thumper display this design perfectly against the brighter night sky. Not only does this add to the intentionally invasive feel of the Combine’s architecture, but also clearly puts emphasis on the architecture’s importance as focal points of the scene through the difference in shape activity (Graham 1970: 45). In this alteration of the picture the difference is highlighted by Photoshop’s *find edges* filter:
Here the great contrast between the jagged, broken shapes of the bunker and thumper versus the rounder, flowing landscape is even more apparent. Since the player may sense that these two shapes are of similar origin, she may relate them to each other, which helps her understand the scene’s challenge; take out the bunker in order to disable the thumper and move on.
6.2.3 Increased shape impact through HDR-effects in the bunker-scene

Another implication of the staging of the bunker and thumper and their distinct shapes is that the player becomes aware of them early, allowing her to formulate a strategy rather than walk into a trap. Since their shapes are so clearly more active than their surroundings, a phenomenon known as the surface effect comes into play. The surface effect states that relatively very active shapes may be perceived as closer to the viewer no matter their distance in simulated space (Graham 1970: 46). In this case there is a prominent atmospheric perspective in the scene evident in how the power lines to the left recede into the distance, reducing surface effect. In effect the player is aware of the importance of the shapes and what they signify for her future.

This scene also illustrates one possible solution to a problem facing every game which aspires to create some kind of illusion of realism, the problem of subject matter authenticity versus the impact of graphical composition:

It is a fact that realistically rendered objects tend to be accepted by viewers at face value; if an object is illusionary enough to be taken as a part of the real world the viewers’ attention will be on that object’s real world function. The problem is that this happens at the expense of the composition’s statement; as picture elements become more realistic, their emotional relation to each other tend to lessen in importance (Graham 1970: 14).

Since 3-dimensional games rely on realistic space as their setting, this becomes a problem when compositional theory is applied to them. In the bunker and thumper scene, however, a possible method for a workaround presents itself. It might be possible to control the scene’s lighting so that detailing is nearly completely lost as the player approaches the bunker; this causes the impact of the subject matter to decrease which allow the shapes to be more easily read:
This is what the approach to the bunker area looks like in the unaltered game, notice that this screenshot is from an earlier position than the last, with another thumper visible in the foreground:

![Unaltered Game Screenshot](image)

Fig. 18, Source: Valve Software

The greatly contrasted shapes of the thumpers and the bunker’s array can be quite easily read and related to one another. It is possible, however, to present this scene in a way that puts even greater emphasis on their shapes; by pushing the picture’s values by applying HDR shaders. The picture below has been altered in Photoshop to simulate these effects:
Here, the sky has been overexposed as through bright moonlight, temporarily blinding the player as she approaches the scene. This effect is usually used in games when a player moves from a very dark area to a brightly lit one, like from underneath an arch into mid-day sunlight. Incidentally, this scene takes place just after the player exits a system of caves; an excellent opportunity to use this effect in order to reduce the rendering detail so that extra emphasis is put on the shapes she will need to be attentive to during the coming level.

As the player draws near, the bunker and its surroundings comes into the light gradually, like a fade in. This change of emphasis from shape to volume allow both the carefully designed shapes (during the approach) and the geography of the scene (during the ensuing fire fight) their distinct moments of importance when their respective information benefits the player the most. It should be noted that in the altered picture the size of the two far shapes have been slightly increased to counteract loss of readability through pixelation.
6.2.4 Quake 2

This scene in Quake 2 has been chosen to illustrate how shapes’ progressive nature may be exploited to lead the player onwards and bring different parts of -or even several scenes together. This is how it appears ingame:

![Image of Quake 2 scene](image-url)

Fig. 20, Source: Id Software, Activision

In this level the player is tasked to run a circular course collecting several objects of importance, then return from where she came and use these objects back in the previous level. The circular shape of the level could be emphasized easily, giving the player a sense of direction and purpose she may not receive from wandering more aimlessly. In this alteration the scene has been changed so that there is a clear connection between the different points of exit from this room:
This is nothing else than a simple band connecting the doors. It does still serve the function of communicating the circular nature of the course to the player however, eliminating the risk of awkwardness as she returns to her point of origin.
6.3 Linear and atmospheric perspective

Both linear and atmospheric perspectives are concerned with the creation of depth, a very important and natural element and potential focal point for the player in any game that feature 3-dimensional navigation challenges. Results indicate it is possible to use linear and atmospheric perspective in order to strengthen the effect of perceived depth in a scene, as well as use them contradictory in order to lessen the emphasis on depth in a scene or to restrict the deep areas so that the entire visual range does not read as being important to the player. The contrasting elements the techniques bring under control are shallowness versus depth.

Fig. 22, Source: wikipainting.org

Leonardo used linear perspective in order to direct the viewer’s interest in his famous take on The last supper. By placing his single vanishing point behind the head of Christ, he ensured that all converging lines in the picture would point to that location, drawing the viewer’s eye there.
As Aelbert Cuyp shows in his *Windmill by a river*, atmospheric perspective can be used to increase the sensation of depth even when there is no strong sense of line convergence in the picture. The elements contrast of hues and values in relation to the atmosphere decrease as they recede into depth which helps establish the fore- middle and background of the picture.

One effect of using atmospheric perspective is that contrasts in value and color are reduced the further into depth the viewer looks: this may be used in games to give limits to a scene or to allow the player to focus on her immediate surroundings without being distracted by a background that may not be important for her task.
6.3.1 Mirror’s Edge

In this example from Dice’s *Mirror’s Edge*, the scene’s depth is staged so that the player is presented with two viable routes. As the player nears the forking of the path, the left side is filled up with enemy characters, forcing her down the right:

![Image of the scene from Mirror’s Edge](image)

This is a perfect example on how players can be counted on to actively seek out depth in the level and how designers can make depth the focus of her attention very quickly. It could even be said that if no other focal point exists in their field of view, players would most likely default to focusing on deep areas of the scene, given that they perceive them as accessible. Since first person shooters require players to navigate through some kind of 3-dimensional space they can be said to be staged entirely in depth; players’ progression through a level can be measured in how much depth they have covered. As a logical consequence players will be drawn to openings in the scenes since these usually indicate a way to progress through the level. Players will seek out depth as water seeks the ground; the water flowing around obstacles pulled by the center of gravity, players around the geometry of a level pulled by the force emitted by the finish line.

Also worth mentioning is the increase of depth sensation brought by the red shapes painted on the walls and by the overhead pipes. Notice that the doorway in the middle of the scene could very well be considered a valid approach, but has been previously established as inert by the game mechanics. The fence to right however presents no hindrance to the player; at this point in her progression through the game she is aware that it can easily be scaled.
6.3.2 Portal 2

One problem related to perceiving the importance of linear perspective is that it is so essential for our understanding of the natural world that we humans are seldom aware of it in nature, even though it is always experienced (Graham 1970: 38): That is unless line convergence is very strong.

In cases where line convergence is extreme the progressive nature of the lines, their tendency to lead the eye, will often place the lines’ vanishing point in focus, like in this elevator shaft from portal 2:

![Image of Portal 2 scene showing a narrow, vertical shaft with a vanishing point in focus.](image)

Fig. 25, Source: Valve Software

The atmospheric perspective here adds to the sense of depth the player experience, working in tandem with the linear perspective. It also serves a second, if less pronounced purpose of limiting the player’s area of interest. In some scenes Valve uses atmospheric perspective predominantly for this purpose; to establish the limits of a scene:
This clear restriction of interest that comes with the loss of contrast that the atmospheric perspective brings communicates that the player’s emphasis should lie on her closer surroundings. Even though the player experiences great depth in this scene, she is never lured into falsely assuming that she is meant to interact with anything beyond the box-like room of the level. Had it been the designer’s intention, the scene in the elevator shaft could also have been restricted in this way:
Compared to the same scene as it originally appears in Portal 2, the intensified atmospheric perspective along with the depth of field effect reduces the power of the converging lines of the elevator shaft. This is intended to put focus on the lower levels, closer to the player. The idea is that if the player is unable to see his possible destination at the end of the shaft, she is less likely to consider it as her intended goal of the scene. However, for this technique to have full effect, good game design practice dictates that another goal should be made apparent to the player so her objectives remain clear.
6.4 Creating focal points through contrast in the level of detailing

The definition of detailing used in this section differs from how the term is usually used where games are concerned. Normally it tends to relate to the technical aspect of how minutely a scene can be rendered without sacrificing too much computational performance, or to the amount of noise or decorative elements the designers put into their game. Usually graphic noise is added in order to create a sense of realism by mimicking the way the real world divides into smaller and smaller components on close inspection. Decorative elements like for example architectural details, landscape foliage or costume details are added in order to give the world a sense of credibility and context, as well as being pleasing to look at to the player.

The first of these concepts, the technical aspect, simply define the borders within which the designer works; he must try to create a meaningful experience for the player regardless of what his technical limitations are. The second concept however, adding noise or decorative details, is under the designer’s direct control. If he has a good idea of what he wants to communicate, the details he places within a scene can be arranged so that they become more than just decorative elements; they can be centers of interest that tell the story of a scene’s purpose. The level of graphic noise is usually an overall stylistic choice relating to the entire game rather than the arrangement of particulars elements and will not be taken into account here.

Contrast in the level of detailing is thus narrowed down to refer to the composite impact of several of these details relative to their surroundings, rather than the contrast between individual elements. Details refer to elements in a scene that are perceived as singularly unimportant to the player, but through their combined impact may draw her attention. By arranging these details in groups the groups themselves can create enough visual activity to become the natural focal points of the scene. Should the player be intrigued enough by such a group that she decides to move in for closer inspection, individual details of that group may take over as new centers of interest. In this regard the group is foil to the elements of interest within it.

It is possible to arrange these groups into tiers, each tier drawing the player in one step further into the area of interest. For example, in a murder mystery adventure game, a player may be drawn towards a richly carved writing desk laden with writing paraphernalia. As she moves closer her interest is captured by a richly ornamented diary on the desk next to an overturned inkwell and inkblot. Upon further inspection, the diary is revealed to contain clues to the mystery. When the player entered the room, the desk’s decoration and the objects on top of it were foil to the diary’s group, which in turn acted as foil for the text in the diary. In this way details that could have been put in the game simply to be decorative are given greater purpose.
Christ carrying the cross by Pieter Bruegel the Elder contains several groups that are meant to first draw the viewer’s interest and then tell a specific story related to that group. There is the group comforting the Virgin Mary in the foreground, the group of people on the far right that have gathered around the site of the impending crucifixion, the soldiers riding in to the picture’s frame from the left and many more. There is in fact scarcely a character in the entire picture that is not related to and grouped with others, except perhaps Christ, hidden in plain sight in the picture’s exact middle. By grouping details like this, Bruegel made sense of what could have been a haphazard sea of randomness and is able to tell many separate stories in one picture, without sacrificing the impact of the scene as a whole.

Arranging a picture like this, without a clear center of interest, is called using a delayed entry (Graham 1970: 316). Usually the entry refers to the attempt to straightforwardly lead the viewer’s eyes to what is of interest in a picture (Graham 1970: 306). When the point of the picture is not immediately apparent, the picture instead registers as a puzzle. A skillful artist, or level designer, may place his elements so that the viewer receives clues to the overall scene, again allowing her to use the law of closure to assume an active role in the telling of the narrative.
6.4.1 Half-Life 2

One major problem in how players will perceive the elements of any scene is how the player herself is responsible for moving the camera; thereby controlling the framing and denying the designer any possibility to use cinematography to aid his storytelling unless through cut-scenes or imposing restrictions in the player’s camera, neither of which are techniques discussed here. This problem becomes evident the moment the designer tries to place any object in any space whatsoever; somehow he must either make sure that his designs work as intended from multiple vantage points, usually from several different distances, or somehow limit or predict the player’s field of view. When ordering the level of details of a scene this problem becomes acute, as in this example from Half-Life 2:

Fig. 29, Source: Valve Software

What could be said to be the focus of this picture of Dr. Kleiner’s lab? Perhaps the tanks of nondescript liquid together with the carpet dominate through their relationship in color? The printer and magnifying glass because they are physically closer to the player in space? The dark blotch on the floor because of the questions it raises, what happened there? The question changes dramatically as the same scene is viewed from a different vantage point:
From this vantage point all of the elements proposed above no longer strongly register as individuals; instead they are more likely to read as members of their local group. From this distance the player may find her interest divided by the group of lab equipment, the two characters, the lighted doorway to the right or even the billboard and notes on the far wall. Singling out a particular object from any group becomes harder as the distance increases. Thus the singular objects are reduced to details and their surrounding groups become the actual events, all by stepping just a few paces backwards. At this point it might even be appropriate to regard the groups as *foil* to the individual elements.

Any object of interest within the groups that would otherwise have been too insignificant to register on its own will now have a fighting chance in receiving the player’s attention, with the reservation that they will be being contextualized with the objects surrounding it. The dark blotch is for example likely to be read as the result of a lab accident due to its vicinity to the equipment.

In pictorial composition it is recognized that either the volumes or the space may have dominance over a picture, the picture can either be about *volumes in space* or *space which contains volumes*. If space dominates, or in other words if the player’s vantage point is from far away, the volumes tend to read more as flat shapes than as actual volumes, making the kind of grouping seen above very useful to increase the shape activity and thereby contrast between a group of elements and its surroundings (Graham 1970: 356).

Such areas consisting of several related details can be very efficiently employed by the designer to add context to the elements he chooses to place within them. Consider the impact...
of seeing a teddy bear in a toy store window; now compare that to the impact of seeing one resting on top of the bed in a prison cell. These are conceptual differences rather than graphical ones, but the example very clearly illustrates how an element can never truly exist as a solitary entity. Any element will influence how its immediate area is perceived, as well as be influenced by its surroundings. The following example shows how individual details can be arranged in groups in order to convey specific meaning, just by their association with each other:
6.4.2 Half-Life 2: Groups of objects as tiered centers of interest

This example also shows how a scene can be set up with multiple vantage points in mind, each telling a part of the larger story. For each step in the player’s progress through the scene new pieces of information are fed to her, again allowing the player to involve herself as an active element of the storytelling through the law of closure. As the player moves closer, individual elements will become new centers of interest, taking over the role from the group they belong to. These elements in focus are themselves subgroups working as foil for the next level of elements that became apparent by moving closer, and so on:

Fig. 31, Source: Valve Software

Here, the player is driving down Highway 17 in her buggy. In the distance a group of objects are revealed, arranged around the old house. She becomes aware of a column of smoke rising from the yard. Should she choose to investigate this area of interest rather than just driving past, this is what will face her:
As she drives closer she is attacked: some *Combine* soldiers were occupying the yard. Notice that the group of objects from the previous picture has changed from being perceived as a composite entity into a number of individuals by moving the vantage point forward in depth.
After she dispatches the soldiers and moves into the yard a gruesome sight presents itself to the player: The charred remains of the Combine’s victims and former occupants of the house. Notice the Combine vehicle to the left. Should she venture into the house the details the player finds there add up to the story already told from the previous vantage points:

![Fig. 33, Source: Valve Software](image)

Overturned bottles and bloodied floor, all that is missing are the bullet holes.

So when ordering the elements of a scene into areas of contrasting levels of detail the designer must take into account all of the possible vantage points of that scene available to the player at different stages of her progress. This tiered approach to establishing scenes has great similarity with how a filmmaker might set up a scene in order to convey a sense of continuity to the his audience, by beginning a sequence with an establishing shot before moving the camera closer to the circle of action with medium shots and finally inside it with close ups (Katz 1991: 121-129), utilizing each step of the way to convey different relationships and emotions to the viewer.

![Fig. 34, Source: Valve Software](image)
6.4.3 Groups of details versus dominant singular element

The same phenomenon responsible for making elements stand out as groups can also be actively used in order to reduce a singular object’s importance by associating it with such a group; drawing attention to the group at the individual’s expense. Consider the following scene:

Fig. 35, Source: Valve Software

This is a PA monitor hung in the train station in Half-Life 2’s opening scene. The game’s main antagonist, Dr. Breen, is addressing the masses through a public announcement broadcast. The monitor has been sized and placed so that Breen’s dominance over the surroundings is assured, with all the lack of subtlety characteristic of dictatorial regimes. The monitor stands out on its own due to its size and position as well as shape and color contrast in regard to the rest of the scene. It would be much more likely to be regarded as a singular element rather than as a detail of a group, for example the group of posters it shares the wall with. The relationship is the extreme opposite of the following scene:
The same public announcement broadcast made by the same character delivering the same message, yet reduced to a miniscule detail of the surrounding room! Notice the glaring contrast in how the dictator likes to present himself, if he can order things to his own liking, versus how he is actually perceived by his subjects in their homes, in this case watching him on the tiny television near the picture’s absolute middle.

The lesson to be learned here is that if an object is to be regarded as part of a group it cannot contrast too greatly with its surrounding elements: If an object dominates its surroundings, it will read as the center of interest by itself and will be considered as being apart from the rest of the scene. Should contrast be reduced the object might eventually recede into the surroundings and the player would first have to read the group of objects around it before registering the important object itself. This process would not only be subtler and more involving (since finding out about the point of the scene takes more effort from the player’s part) than throwing the object of interest straight in the player’s face, but would also color her experience of that object: After all, an object that is part of a group would be contextualized as belonging to that group. This way of reducing or increasing an element’s impact on a scene by moving it in or out of its surroundings can be effectively used in order to control whether a concept reaches the player in an explicit or subtle way.

In Half-Life 2 the developers actively worked to tone down much information relating to the state of the larger game world, choosing not to explicitly explain the player’s situation fully. This created a distinct feeling of uncertainty, and also of being a detective uncovering the reasons for the game world’s transformation. For this reason, most of the Combine’s propaganda posters the art team created were excluded from the finished game. As developer
Randy Lundeen stated in *Raising the Bar*: “…most of the posters detracted from the atmosphere, and were doing the job of sledgehammers where tweezers were required” (Valve Corporation 2004: 182) The example from Valve’s book does not directly relate to managing levels of detail, but it certainly highlights an important concept to take into account: How explicitly a piece of information is delivered to the player will be important in determining the impact of the finished game. Managing an important element’s dominance using the technique above is one potential way of bringing this under the designer’s control.
7 Conclusions

The purpose of this thesis is to answer the question of whether or not compositional techniques that have been developed for fine art and photography are useful to level designers who want to create clear and legible levels. The conclusion is that there are several techniques which could potentially be used in 3-dimensional level design to great effect and that awareness of these should be considered important as part of a level designer’s skillset.

The results are able to establish that the application of certain techniques known to increase legibility in pictures may be likewise applied to games for similar effects. This suggests that on some level there is reason to believe that players will respond in a similar way to level design as they might to a picture; to an extent both seem to be governed by the same rules.

The techniques investigated have long been recognized for their power to bring the phenomena in question under the artist’s control, allowing him to make informed decisions about how he communicates to his viewers. Since the level designer faces many of the same problems as the artist concerning directing the players’ attention when creating his levels, the techniques constitute valid tools for him as well. Listed below are the investigated techniques alongside with the phenomena they were found to govern:

<table>
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<tr>
<th>Technique</th>
<th>Phenomenon</th>
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<tbody>
<tr>
<td>Limiting a scene’s range of hues and values</td>
<td>Contrasts in hues and values</td>
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<tr>
<td>Designing and arranging shapes</td>
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<tr>
<td>Creating depth through linear and atmospheric perspective</td>
<td>Contrasts in shallowness versus depth</td>
</tr>
<tr>
<td>Arranging levels of detail</td>
<td>Contrasts in graphic activity between groups of elements</td>
</tr>
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Fig. 37

From these results a fundamental conclusion can be drawn: if one great problem is shared between different graphic media it is the need to order graphic contrast: Contrast seems to be such a fundamental component in how human beings understand the world that the need to bring it under control is universal. Likewise, the techniques that are applied to this end transcend media, time period and even the intentions of the artist or designer who employs them. Ideas and intentions may change over time, medium, application and artist; these tools will still be part of the fundamental vocabulary of graphic communication, no matter what message is being communicated.

Since the techniques are imperative tools for establishing legibility, the fact that the games in this study feature a free player controlled camera does not impact on the usefulness of the investigated techniques. The player still experiences her surroundings as contrasting elements and will still regard the areas of the greatest contrast as natural focal points. However, since the designer lacks camera control he faces the additional challenge of either limiting the player’s interest in another way or setting up scenes that fulfill their purpose from multiple vantage points.
8 Analysis

Since graphic composition may be employed as a tool to create legibility in pictures or game scenes it is in turn logical to assume that failure to take graphic composition into account will result in the opposite; illegible scenes. This makes graphic composition a critical tool to take into account if a level designer is at all interested in communicating graphically with his players and highlights the need for level designers to have at least some understanding of graphic theory. Even if compositional techniques are not consciously understood by the designer the phenomena that they govern will always be in effect and must be taken into account regardless: Compositional techniques cannot simply be discarded as a tool of post-analysis.

Communication by emphasizing areas of the level graphically is a non-exclusive technique; no distinction needs to be made regarding what type of information is conveyed. A designer might choose to emphasize areas that relate to the background narrative of the scene, as well as areas that relate to where the game mechanics might be applied at his discretion. Focal points are created by the ordering of graphic contrast in a scene. Since graphic contrast does not relate directly to subject matter, anything could be made into a center of interest as long as the contrast to its surroundings is sufficient.

The fact that graphic activity and subject matter are completely unrelated unless made so by design is something the designer must constantly keep in mind: Game design and graphic design are two separate fields that may conflict unless careful considerations are made. It is logical that players are tempted to order a scene’s elements with regards to their subject matter instead of their graphic relation to each other. Consider the example of the Tank scene from Quake II: By placing the light cone on the powerup the designer can only hope that the player registers its presence, her actual interest in the powerup is likely to be determined by how much it would benefit her to pick it up. It is in the nature of game design to teach the player general relationships about the world she visits when playing, such as for example the relationship between a first aid kit and her health. It is in the nature of graphic composition to teach her about specific relationships between the elements of a certain scene, such as for example where the player should focus her attention or where important pieces of information can be found. It should be considered a priority of the level designer to make sure that these two concepts harmonize rather than clash.

It is important to understand that choosing what should be present in a scene and how it should be presented graphically are two different problems. In the detailing section, the impact of finding a teddy bear in a prison cell was used as an example in order to highlight how elements of a scene relate to their surroundings. The contrast between teddy bear and prison cell is conceptual, it is a narrative device used to tell the player a story. How the teddy bear is placed in the scene and what it looks like in relation to its surroundings are questions of graphic control, these traits will determine how likely it is to stand out graphically. A graphic focal point does not have to be to a conceptual one, both views need to be considered when ordering scenes.
With these weaknesses in mind it is clear that regardless of how useful compositional techniques may be they should never be allowed to become a purpose unto themselves. Games are first and foremost converging media; they are the composite experience of several types of expressions that merge into one. Compositional techniques should be employed for the purpose of unifying these expressions so that the overall purpose of enhancing the player’s experience is served. No matter how interesting they may be to simply look at graphics created as standalone entities will detract from the total experience.

The techniques used in graphic composition constitute visual tools that can be used to guide the player’s attention. By placing an area in focus the designer greatly increase the chances of drawing the player’s eye there. However, a well composed scene does in no way guarantee well achieved communication. As in all forms of art, there is a distinction between what the designer intends to communicate and his chosen tools, in this case graphic composition. Unlike language or symbols, graphics does not come with closely pre-decided rules for its interpretation; therefore there is no fool proof way of ensuring that the player will make the interpretation the designer intends. It is reasonable to conclude that the more complicated concepts the designer wishes to convey, the more effort he needs to expend in teaching the player about them. Again, graphic composition is not the issue here, but rather the concepts the designer conveys through it.

However, the need of player interpretation can be used to great advantage, making the player aware of concepts on a subliminal level by communicating through moods and emotions rather than direct explanation! Consider the scene with the bunker and thumper from Half-Life 2. Juxtaposing the alien architecture with a familiar terrestrial landscape not only ensures that the structures become the natural focal point of that scene, it also tells the story of the invaders relation to the world at large. Since games feature several scenes in sequence such concepts can be reinforced many times over depending on how much the designer wishes to stress them.

The example of the Combine’s relationship with humanity is an example of a profound concept communicated almost exclusively through graphic composition. If the designer desire, communication could be far less abstract and more to the point. This can be done by establishing synergies with the game mechanics. In Portal 2 the same developers, Valve, designed quite a long sequence where the player is taught that a lit area is an area she can place portals on. In this instance, one graphic feature equals one application of game mechanics, in this way Valve can construct vast scenes full of details without confusing their players. Once again, the tools prove to be universal, leaving any designer who masters them free to use them to convey whichever concept he wishes.

It must also be mentioned that this thesis only very briefly acknowledges that games are sequential media, thus taking no account of movement of camera or actors, nor the fact that each scene is part of a sequence of many. Even though the compositional techniques investigated are universal enough to be used not only on still pictures but moving ones as well, composing moving pictures adds challenges are that are not discussed here. Not only
must the designer account for what he communicates from each available vantage point, he must also make sure that there are logical transitions between scenes and decide the pacing, for example.

In order to further the understanding of how graphic composition relates to level design, a study that investigates the use of the compositional techniques described in this work is desired. For this purpose, studying an actual interactive game environment would be a logical next step for any interested scholars. Researchers might create their own environment to conduct their experiments in or choose one or several from an existing game, given that specific techniques that are being investigated can be isolated. Such a study might incorporate a group of suitably picked test subjects and ways of registering their responses, for example through equipment that register eye movements. The resulting empirical data should greatly add to the understanding of how compositional techniques may be applied to game graphics and would increase the validity of any findings.

As closing words, it should be stressed that the kind of non-verbal communication that narrative environments entail does not detract from the values of good dialogue writing or cut scene direction; all are valid ways of communicating with the player. However, for a medium that is characterized by interactivity as a method of creating immersion, it would seem natural to convey narrative using visual tools that stimulate immersion as well. If it is the designer’s intention to create an involved experience for his players he should certainly consider using methods of storytelling that do not require being clearly separate from other areas of the game. After all, gamers value games for the experience of **playing** them. In his book on the nature of games, *A Theory of Fun*, Raph Koster criticized games for regarding their stories as separate entities to be grafted on to them with no obvious relation to their interactive parts (Koster 2005: 86). Incorporating the storytelling into the level design suggests one possible method of bridging this gap between game design and story writing. Graphic composition could prove an invaluable tool for those who would try.
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