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Is gaming becoming funkier? Dancemat interfaces haven't just introduced thumping bass lines to gaming, they also make players sweat. Add the strain of new motion control interfaces such as the Wii, Kinect and Move, and the result is a more pungent smellscape for digital gaming. This has caused some players to rethink their seduction strategies:

Seriously, Kinect might just be the first game machine that can make people stink at a party. I guess if you don't want to stink up the party, don't be the first to play Kinect. That girl or guy you are interested in my not like you much because of your Kinect smell. Perhaps it is better to wait till the party is almost over to play Kinect. (booniga 2010)

This moment of social anxiety gives an inkling of the untapped power of smell in game design. Body odors do play a subtle yet powerful role in sexual attraction (Herz 2008). But when *Kinect smell* becomes an occasion for player speculation about attractiveness and hygiene, we would also do well to bear in mind what sensory anthropologists have long contended: that the sense of smell remains a contested site in which cultural norms are explored, negotiated, enforced and transgressed (Classen, Howes and Synnott 1994) (Fig. 1). New technologies engage persistent habits.



Fig. 1 Pegasus Games, Madison WI. is a game store where people gather to play *Warhammer*, *Magic the Gathering* and *Dungeons and Dragons*, among other games.

The billowing odor of active players is not the only feature in the smellscapes of gaming: there have also been a number of physical and digital games that were designed to incorporate smell into gameplay. One of the more interesting digital examples remained unrealized: in 1988, computer game director Hideo Kojima proposed a smell project: to coat the floppy disk of the game *Snatcher* (Konami Industry Co. Ltd. 1988) with a special emulsion that would be activated by the heat of the computer to release the smell of blood, "the stench of a murder scene" (Ashcraft 2010). The Konami brass turned thumbs down on the idea, in effect demonstrating their grasp of media history, but not their ability to envision the potential of scent in digital games. This was left, instead, to a couple of naughty adventure games: *Leather Goddesses of Phobos* (Infocom Inc. 1986) and *Leisure Suit Larry: Love for Sail!* (Sierra On-Line Inc. 1996). Both games came with Scratch-and-sniff cards (à la *Polyester* (Waters 1981)) that were cued to particular moments in the game, and offered up smells ranging from perfume and suntan oil to stinky cheese and farts.

What is the game designer to make of this? We now have living rooms that smell more like locker rooms. We have low-tech—and, increasingly, the potential for high-tech—smell systems that can add scents to the fragrant brew. This is a good time to consider smell in games. There is no commercially available, common platform for integrating scent into digital games, meaning that we are not locked into any one approach to designing scent. At the same time, the psychological appeal of mediated scent experiences is clear. Integrating smell into gameplay has the potential to create play experiences that offer the intimacy of a chemical sense; when you smell something, you are detecting molecules of that substance that have entered your body. Scents also have the potential to access emotional responses that are unique, such as disgust (Liberman and Pizarro 2010), as well as other powerful attraction and avoidance mechanisms that are of undoubted interest to those concerned with interaction (Wrzesniewski, McCauley and Rozin 1999).

The opportunities for scent design in games become even more compelling when we reflect upon our own memories of scent and play. We cherish the smell of the freshly mown grass of the ball field, the waxy odor of the buffed wood court, the oily smell in the garage where we play board games. Though smell currently plays an insignificant role when it comes to analyzing and designing games, it is intimately linked to the retrospective pleasure we take in them. Even though we seldom use smell to understand the state of a game (smell, for example, doesn't inform baseball players that the infield fly rule has just been invoked by a popup), smell does have the peculiar power to enable us to conjure up and reconstruct games as felt, whole experiences. For this reason, smell retains a tantalizing appeal for the designer of play. Playfulness is one way in which we reclaim our humanity, and smell is one of our most basic channels for engaging the world.

Yet the history of designing mediated scent experiences is a litany of failure. Not only did media experiments such as AromaRama, Smell-O-Vision and the DigiScents iSmell computer peripheral sink without a trace, they have been mocked in retrospect, as if the effort to engage smell in media and computational forms was in itself laughable (Tynan 2006). The dismissive attitude of our culture towards smell is a nagging subtext in any speculation about the possible role of scent in games and play. Given the striking set of challenges and opportunities for scent design in games, this study will attempt to conduct what Frans Mäyrä refers to as "multiple

theory triangulation” (Mäyrä 2009, p.319) as a means of producing research for design (Laurel 2004). Sensory psychologists illuminate the workings of the sense of smell, and the challenges of designing for it. Sensory anthropologists and writers of fiction tell us about what scent can mean to people and cultures, sketching a world of expanded possibility, while interaction design researchers offer practical cases of how smell has been integrated into interactive systems. Combined with a survey of games that engage scent and scent themes, this study will speculate about the potential for fragrant play, and generate design heuristics and concepts for experimental gameplay related to scent.

Game aesthetics terms can provide us with a set of organizing foci. An aesthetic perspective in game studies has come to take on various meanings, is laden with a range of assumptions, and has been articulated using different methods. Some scholars invoke the term “aesthetics” to describe any serious effort to understand digital games as a unique interactive media form, and game design as a unique design practice (Salen and Zimmerman 2004), while others use the term to illustrate overarching qualities of the play experience (Grodal 2003). This study is built on the contention that a game aesthetics perspective directs us towards three discrete yet intertwined approaches: to explore and account for the relationship of the body and senses to our experience of games and play, to articulate the relationship of games to other art and media forms, and to flesh out our engagement in the “aesthetic experience” of gaming pleasure (Niedenthal 2009).

The approach to game aesthetics in this study consciously harkens back to pre-Kantian concepts, in which, as Rindisbacher (1993) points out, a “grounding in the sensory and sensual dimension of the object world and its roots in the bodily realm” had not yet given way to more intellectual and theoretical concepts (p.16. See also a similar argument in Howes 2005, p.246). Indeed, in his groundbreaking philosophical work from the 18th century, Baumgarten based his conception of aesthetics upon sense cognition (Gregor 1983). Revisiting this largely abandoned stream of thought allows us to position aesthetic practice as sensory inquiry, not solely as philosophical discourse. “Obscure ideas,” arising from sense impressions that we are not actively aware of, serve a binding role in Baumgarten’s thought, working through association and “introducing into our present perceptions echoes of what has disappeared from memory” (Gregor 1983, p.367). The uniquely evocative sense of smell, as we shall see, also works through association, has a particular relationship to memory, and is the perfect sense through which to explore “obscure ideas” that can influence our play.

The Smellscapes of Gaming

Speculation about the potential of smell in games needs to be rooted in full descriptions of the panoramas of smell that are created by players and games within ambient smell environments. The spaces in which we play are not neutral from an olfactory standpoint; whether we play in domestic or public spaces, the air is scented with any number of volatile elements. Drawing upon the disciplines of geography and environmental aesthetics, Porteous (2006) proposes articulating “smellscapes” with reference to persons, place and time, with the caveat that, due to the nature of scent, smellscapes will be “non-continuous, fragmentary in space and episodic in time”

(p.91). Gaming environments can be investigated within this framework. There is some evidence that the smellscape of board gaming (which usually calls for a table as a support for gaming equipment) are influenced by the food and cooking smells of kitchens and dining rooms. In a thread entitled “Does your gaming space smell nice?” a majority of the posts mention food, either as prepared earlier in the space of play, or as snacks eaten around playtime:

We play on late Sunday mornings, so my gaming space (the kitchen) usually smells like hot bagels, pancakes, or muffins, freshly brewed coffee, and occasionally bacon and eggs sizzling on the skillet. (RPG.net 2010)

Other spaces mentioned include basements and garages, some of which are perfumed by dead mice, scented candles, and the dusty smell of old board games. Another gaming environment with a fairly clear olfactory profile is the Japanese game arcade. According to a recent survey, 26.7% of the Japanese public believes that arcades smell too strongly of cigarette smoke (Parkin 2010).

Perhaps the best-known—and most hotly debated—figure in the smellscape of gaming is that of the stinky player, obsessed with gaming and negligent of hygiene. Traces of this figure can be found in online debates and asides in various fora:

Recently on BoLS (*Bell of Lost Souls*, a wargames forum), The Girl wrote an article on hygiene among gamers. I was amazed at the amount of flaming that took place in the comment section. People did everything from cry stereotype to bitch about the article being worthless. There definitely is a stereotype out there of the stinky gamer. I hate to break this to you lads and lasses, the stereotype exists because it's true (Crazy Red Praetorians 2010).

In “The Great Soap and Water Debate or Stinky Gamers Do they Exist” thread in the *Bell of Lost Souls* lounge, Eldargal argues that the stereotype “is real, and it is horrid. I would say at least half of the gamers I've encountered outside our group (where we made deodorant compulsory to combat it) are at least ripe or worse.” (*Bell of Lost Souls Wargaming news* 2010) The thread also contained a poll on “Does the smelly gamer stereotype really exist?” to which 84% of the respondents answered “I see (and smell) them every week” (notably, 0% of the respondents confessed to being a smelly gamer themselves! (Fig. 2)).

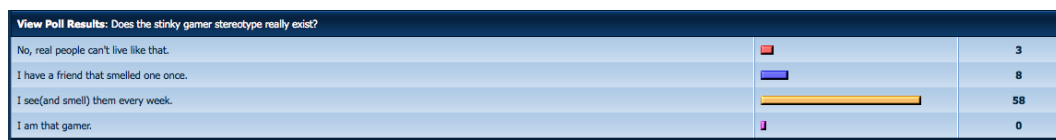


Fig. 2 Source: *Bell of Lost Souls*. 84% of the total 69 respondents “see (and smell)” stinky gamers every week.

More work mapping the smells of our gaming spaces is called for, but it is fair to say that we often smell when we play (whether of vigorous effort, negligence or deodorant), and it is only the force of habit that makes us unaware of our own funk.

The Challenges of Designing for the Sense of Smell

Adaptation or habituation—our tendency to become unaware of odors to which we have been exposed over time—is just one of the characteristics of smell that complicates the designer’s task. Our olfactory systems are complex, and not fully understood. We have about 20 million smell receptors in the sensing tissues in our cranial cavities (Herz 2008). There are 1000 different types of smell receptors, of which, in humans, about 65% are vestigial and no longer function, meaning that we have about 350 different kinds of working scent receptors (contrast this to vision, which works through 4 different kinds of light receptors, or taste, which extracts a wide range of flavors from 5 types of taste buds). Moreover, the specific collection of functioning receptors possessed by any individual is encoded genetically and may not overlap with that of other people; it is not uncommon for individuals to exhibit specific anosmias (inabilities to smell) related to particular scents. Indeed, extreme individual variability in scent perception is one of the hallmarks of the sense of smell (Gilbert 2008, Porteous 2006). Although some studies have been run on innate smell preferences (looking at the smell responses of infants, for example), smell is a sense for which the evidence of cultural and learned influences is very strong (Herz 2006, Porteous 2006). One constructive conclusion we can draw for the game designer is that the influence of culture and learning on smell—as well as the great variability of individual smell capabilities and preferences—favors game and play strategies related to customization, collection, and trading.

Once an odor is detected by our smell receptors, an impulse moves in a relatively unmediated shot to the limbic system, the core of emotion and memory (Higgins 2002). Smell is unique as a sense in that the smell receptors themselves are actually neurons, and represent the one place at which the brain comes into physical contact with the world. Unlike other sense input, the smell impulse undergoes very few connections within the brain during transmission (Stamelman 2006). These structural features of the physical smell system can account for some of the uniqueness of our smell experience: the speed and surprise with which scents can evoke memory and create links to emotional experiences (Rodaway 2005).

Although the brain processes smell stimuli rapidly, smell is still a slow sense—it takes time from the release of a scent until we perceive it, making vision effectively 10 times faster than smell (Herz 2008). Besides the speed of the stimuli, there are a number of other differences between sight and smell. Sight has direction, is active, and can be selective, but odors are amorphous: they “cannot be readily contained, they escape and cross boundaries...” (Classen, Howes and Synnott 1994, p. 4). Further, odors communicate, but are not easily analyzed as a form of language: “smells offer a primary form of experience; they occur ‘in between the stimulus and the sign, the substance and the idea’” (Higgins 2002, p.45. See also Rodaway, p.70). What this means for the designer is that sight-based assumptions do not help when manipulating scents, and that it is difficult to synchronize scent to visual stimuli.

Finally, it has proven difficult to develop digital simulation technologies that engage the sense of smell. Digital media production and distribution is based upon the ability to capture or compose, manipulate, and distribute media in digital form. Digital visual and aural media are relatively well developed, but there is no equivalent for smell—I cannot (yet) sample the scents of a meal or a garden with my iPhone and post them

to Facebook to be experienced by my friends. One major limiting factor is the lack of a system of notation for scent. Although there are domain-specific wheel models to express odors of wine, beer or perfume, there is no universal system for classifying smells (Gilbert 2008). Rather, smell remains “referential:” something must be described as smelling like something else. Contrast this with color, in which a vast number of individual hues can be derived and mixed from a small number of primaries. Color information is easy to specify and transmit, allowing us to recreate patterns on remote display devices. When it comes to smell, however, sampling devices are still in the specialist realm (IDEO 1999), and we are awaiting commercially available scent output devices as peripherals to computers and gaming consoles.

Scented Worlds, Fragrant Play and the Rosewater-Filled Eggshell

The absence of a universal system of smell classification, and sophisticated simulation technologies, has not, however, prevented people from organizing their worlds—and their play—in terms of scent. Sensory anthropologists present numerous examples of cultures that use scent as a medium for categorizing objects, and as a means of organizing and understanding space. The Suya Indians of Brazil, for example, divide their world into bland, pungent and strong smelling things (Classen, Howes and Synnott 1994). Smell in some cultures functions as the key distance sense, often groups that dwell in densely forested areas in which visual perception is thwarted: “Interestingly, whereas in the West sight is considered *the* distance sense, smell often outdistances sight in the experience of forest dwellers like the Umeda. They know that smell can give them knowledge of things hidden to the eye” (Classen, Howes and Synnott 1994, p.98). This observation has relevance to design, pointing to ways in which smell and sight could be modulated in a complementary manner, particularly in situations involving visual occlusion or absence.

Besides cosmologies of scent, there is also a long history of fragrant play; other cultures have exhibited a much tighter linkage between scent and entertainment than our own. Those connoisseurs of scent—the Romans—wove perfume into many of their public games and spectacles. One description of a banquet marvels that the host released doves bearing liquid fragrances above the tables, misting scent down upon the diners (Classen, Howes and Synnott 1994). Classen et al. (1994) point out the way in which collective uses of scent enhanced feelings of social solidarity:

Putting on a good show in antiquity ... involved putting out a good scent. ... Not only would the spectators see and hear the pageantry, they would breathe it in and feel identified with it and each other. (p. 27)

This association of corporate perfume use and entertainment persisted into the Renaissance and beyond: “As in the days of ancient Rome, perfumes often formed part of the entertainment on social occasions. One elaborate seventeenth-century plan for a banquet, for example, had the guests throwing eggshells filled with rosewater at each other” (Classen, Howes and Synnott 1994, p. 72). The eggshell—blown, and into which rosewater has been piped—can be considered an early, low-

tech playful scent delivery device. One seventeenth-century text tells how to make and deploy scented eggshell “bombs:”

egg-shells full of sweet water, you may by a great Pin take all the meat out of the egg by blowing, and then fill it up with the rose-water ... This done to sweeten the stink of powder, let the Ladies take the egg-shells full of sweet waters and throw them at each other. (May 2011)

Essentially an early equivalent of the water balloon, the rosewater-filled eggshell functioned as a party favour that was used for free-form play. Eggshell battles seem to have been a feature of English Twelfth Night banquets (Chambers 2011) and the Venetian Carnival. Besides serving as an opportunity for merriment, the above author notes that the rosewater served to overpower the noxious smell of period cosmetics. This marks one of the first examples of a simple form designed both for play and as a means of intervening in the local smellscape.¹

A Brief History of Scented Filmic Media and Performance

Rosewater also played a role in the first recorded use of scent synchronized to filmic media. In 1906, a movie theatre impresario dipped a cotton ball into rose essence and held it before a fan during a screening of the Pasadena Rose Parade (Paterson 2006). He never repeated the experiment, effectively establishing the precedent of scented filmic media as one-off event. Though there were several other forays into “smellies” in the early part of the 20th century, the most highly developed examples of scent projection were the competing AromaRama and Smell-O-Vision systems from 1959-’60. The AromaRama film *Behind the Great Wall* was essentially a travelogue that used the odors of orange, jasmine, grassland, incense, spices, pine forest, and pungent waterfront to flesh out locations in China (Gilbert 2008). Despite the fact that there were important technical differences between the two systems—AromaRama distributed scent through the theatre’s ventilation system, while Smell-O-Vision piped aromas to outlets under the seats—both systems essentially failed to overcome the challenges of the theatrical use of scent: spatial distribution of scents, synchronizing to the visual track, sequencing scents (and managing the transitions between scents), and residue (the individual scents adhered to surfaces in the theatres) (Gilbert 2008). Both systems were used for a single film each, and then abandoned.

The technical challenges of the theatrical use of scent have recently been revisited, much more successfully, in the “scent opera” *Green Aria*, which was mounted at the Guggenheim Museum, New York, in 2009. In this performance, scent “characters” were associated with musical themes in an “abstract drama of sound and scent” (Alter 2009) (Fig. 3).²



Fig. 3. Source WSJ online. Seating for *Green Aria*, featuring flexible goosenecked scent “microphones.”

The *New York Times* reviewer described the way in which the opera was structured:

At the start, the opera’s dramatis personae, five elements and 18 supporting characters, were introduced. As each name was projected on a video screen, the audience heard the music and smelled the scent associated with that character ... There is no spoken or sung script, just a nebulous story ... But, as “*Green Aria*” proved, the sense of smell powerfully affects the perception of music. (Tommasini 2009)

The lessons we can extract here go beyond the technological advances that make theatrical use of scent more satisfying: scent can do more than simply reinforce visual (and aural) material—it can be used to create narrative resonance. But if smell is going to be used in this novel manner, we need to design learning opportunities into our artistic structures. *Green Aria* introduces the scents at the beginning of the work, and sets up associations with musical themes that help to structure the whole.

Scratch-and-Sniff, Encapsulated

The Scratch-and-sniff card—under control of the user who scratches it and directs it to her nose at the appropriate moment—is a low-tech solution to the problems of distribution, synchronization and sequencing of scents in mediated experiences. Scratch-and-sniff is an application of encapsulation technology developed by 3M in the 1960s as a means of producing carbonless copy paper (Gilbert 2008). Fragrant oils (instead of the originally intended inks) are encapsulated in a shell, embedded in a paper substrate, and, when abraded, burst, releasing scent.³ Scratch-and-sniff came to prominence in the film world through the 1981 film *Polyester*, in which viewers were prompted to sample scents from an “Odorama” card during particular scenes. Conceiving Odorama as an affectionate pastiche of the ‘50s cinematic smell systems, director John Waters moved away from the largely environmental use of fragrance in the earlier movies towards the (sometimes scatological) comic

possibilities of filmic scent related to body odors (Waters famously relished the fact that theatregoers had paid him to smell a fart (Gilbert 2008)). As employed in the movie, Scratch-and-sniff also affords opportunities for surprise, misdirection and comic suspense (“will I be prompted to smell this scene? Eew”). According to some in the audience, the worst smell on the card was that of smelly socks (Gilbert 2008) (Fig. 4).



Fig. 4. Odorama Scratch-and-Sniff card. Note the text urging the user to refrain from sniffing until prompted.

One seeming limitation of using Scratch-and-sniff cards with digital games is the fact that it takes hands away from the controls, and player focus away from the game. It is perhaps not surprising then that two of the key examples of games that have integrated Scratch-and-sniff are adventure games, where both pacing and the general interaction mode allow for pauses in gameplay. Both *Leather Goddesses of Phobos* and *Leisure Suit Larry: Love for Sail!* are, moreover, games with comic sexual themes. They capitalize on the *outré*, campy associations of Scratch-and-sniff established by *Polyester*, as well as other seamy references from the period (such as Larry Flynt’s August 1977 Scratch-and-sniff *Hustler* centerfold (Gilbert 2008)).

Leather Goddesses of Phobos is a text adventure sex farce playable on “naughtiness” levels ranging from “tame” to “lewd,” though the seven scents embedded in the accompanying Scratch-and-sniff card are all pretty tame, and include pizza, mothballs, perfume and leather. The writers of the game sometimes build comic suspense into the use of scent. In the first use of smell in the game, for example, a soiled bathroom is described, the player is prompted to sniff the card, and, rather than urine or feces, is treated to the odor of a pizza slice in the corner (Fig. 5).

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>nw
Gents' Room
  This filthy bathroom belies the existence of disinfectant. A single toilet
  and sink are the only fixtures. More breathable air can be found to the
  southeast.
  You can see a stool here.

>use bathroom
Ahhh...
  Now that the "crisis" has passed, you notice a strong and familiar odor
  pervading the room.

>smell
[Scratch 'n' sniff spot number 1. Hit the RETURN/ENTER key to continue.]
You trace the smell to a dubious slice of pizza, crumpled in the corner.
[Incidentally, we had some pretty putrid scents available, all of which
would've seemed right at home in a filthy restroom. In the end, we were too
kind to use them -- but we were sorely tempted!]

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Fig. 5. Comic misdirection in *Leather Goddesses of Phobos*.

Leisure Suit Larry: Love for Sail! is slightly less timid in its use of odor. Its card embeds nine scents: salt air, coconut (suntan oil), musk, gardenia (perfume), fart, diesel fuel, fish, Limburger cheese, and chocolate (Lowe 1996). The gridded card itself is roughly color coded to each scent (Fig. 6). There are three main strategies to the deployment of scent in the game: environmental, comic and character-related. First, some scents are offered to fill out environments that Larry visits, such as on the ship's deck (salt air), his room in the hold (diesel fuel) or the kitchen (limburger cheese, fish). Then there is the (perhaps inevitable) scatological humor of a fart at the craps table. Finally, and more interestingly, scent is associated with particular characters, such as Drew Baringmore's suntan oil, or Annette Boning's gardenia perfume. Boning is introduced with perfume before we discover her name, and scent is sometimes used to represent her when she is not present in the scene, giving clues to her identity, as when Larry sniffs the seat of her chair (Fig. 7).



Fig. 6. Source: *Leisure Suit Larry Design Document*. Scratch-and-Sniff card from *Leisure Suit Larry 7*.



Fig. 7. The player is prompted to sniff the Gardenia scent of Annette Boning's perfume when Larry smells her chair seat.⁴

7. The Visual Representation of Smell in an Adventure Game

Not long after *Leisure Suit Larry 7*, another adventure game was released which attempted to extend gameplay into the realm of scent, though without actually providing smells. *Discworld Noir* (Perfect Entertainment 1999) incorporates a “werewolf” mode in which odors in the environment become visible to the protagonist Lewton, and can be saved in a smell inventory. A pastiche of hardboiled detective and film noir references, *Discworld Noir* employs odors as clues to advance the game, inviting the player to explore the olfactory traces found in locations and cross-reference them against characters. Sometimes scents suggest trails to be followed, other times they carry information about character.

The sensorium created to represent scent in the game matches odor with color (Fig. 8). Scents in the game are represented as transparent, shimmering clouds of hue, and there is logic to the color associations. Green scents are organic, sometimes malodorous, such as that of the River Ankh. Colors in the magenta part of the spectrum most often represent women, while men are dark blue. Cyan scents are distinctive and individual, sometimes artificial, as in Troll Perfume. Red scents represent reddish things, like wine and rusty iron. Yellow and brown scents seem to be associated with miscellaneous non-human characters. Finally, the scent associated with the killer in the game is represented as a mixture of hue and sparkles, “the color of magic” (Fig. 9). An important feature in the game is the scent inventory, which allows for storing and comparing scents (Fig. 10). Dragging scents to other scents triggers a commentary from Lewton, in which he discriminates between the two scents. Knowledge of scent in the game is integrated into gameplay as a means of advancing the game, compliments Lewton's more traditional, conversational sleuthing, and also provides a side-quest.



Fig. 8. Color is associated with smell in werewolf mode in Discworld Noir.



Fig. 9. The color of magic, trailing a killer.



Fig. 10. Smell inventory in Discworld Noir.

Immersion and Scent

In the intervening years between these adventure games and the present, researchers and entrepreneurs have proposed a number of scent systems for digital entertainment that would provide a high-tech solution to the problems of mediated smell. Scent domes (Paterson 2006), nose-tracked toroidal vortices (essentially, scented smoke rings minus the smoke) (Yanagida, Kawato, Noma, Tomono and Tetsutani 2003) and “nosephones” (Kaye 2004) have all been proposed as means of delivering fragrances synthesized by smell “printers” (Wilson 2000) (Fig. 11), embedded in pots of wax (Bingham 2009) or provided by customized game cartridges (Quick 2011); indeed, the range of technological innovation is only matched by the scepticism of players expressed in online fora. In a recent thread on “Adding an olfactory dimension to games” on Slashdot, there are almost no positive responses to the promise of scented entertainment; instead, there is a (fairly accurate) discussion of the limitations of the sense of smell, several references the adventure games we have been looking at (some fondly), and the occasional post mortem of the DigiScents iSmell. The general tone of dismissal is summed up by the comment “Plenty of games stink already” (Slashdot.org 2011).



Fig. 11. The DigiScents iSmell computer peripheral.

Still, discussions of the potentials of scent in gaming in online fora are not completely negative. Ask people what scent could contribute to gaming, and many will answer “greater immersion” (Paul 2009). The argument here is that adding an additional dimension to games will increase sensory richness and the feeling of spatial presence, thus enhancing immersion: “... we can all agree that smell-o-vision will herald in a new era of spatial presence” (Madigan 2010). A naïve understanding of immersion as sensory verisimilitude, however, offers one of the least promising avenues for the development of scent for games, because, as we have seen, it is difficult to synchronize scent effects to visual and aural media. The problem of scent distribution in home entertainment settings differs only in scale from that of theatrical

spaces. Synchronizing and sequencing scents for digital entertainment poses analogous design challenges around couches and consoles.

As we have seen in our survey of games engaging smell and smell themes, scents are often employed as a means of involving the player more deeply in the fantasy of the game, whether campy sex farce or noir sleuthing adventure. As part of an effort to build an audience for scented media and entertainment, the (now defunct) DigiScents blog listed a set of narrative contributions that smell could make:

- Makes content extremely immersive and compelling
- Creates mood, such as foreshadowing or ambiance
- Intensifies emotions, such as fear or love
- Establishes place and season
- Helps develop characters
- Gives a heightened sense of reality

Here the potential of scent goes beyond merely reinforcing the visual qualities of the environment: it plays a role in defining the game world, including directly affecting the mood of the player and the relationship of the player to in-game characters.

A richer understanding of immersion as related to gameplay, however, must also acknowledge the way in which game challenges engage the player. Developed through extensive interviews with Finnish children, Ermi and Mäyrä's SCI gameplay experience model divides immersion into three components: sensory, challenge-based and imaginative immersion (Ermi, Mäyrä 2007). We can examine each of these components as a site for exploring the potential of scent in games. Scent can contribute in an obvious manner to sensory immersion, since Ermi and Mäyrä associate that feature with the stimuli of the game world. However, the need to move beyond using smells merely to add a novel sensory dimension is a key lesson of the earlier failures of scented media. It is also important to explore what scent can add to challenge-based immersion: "This is the feeling of immersion that is at its most powerful when one is able to achieve a satisfying balance of challenges and abilities" (Ermi and Mäyrä 2007, p. 7). Finally, we can investigate the power of smell to modulate the player's relationship to the fantasy of the game world, through imaginative immersion, which Ermi and Mäyrä define as the "dimension of game experience in which one becomes absorbed with the stories and the world, or begins to feel for or identify with a game character" (p. 8). Scent can, as we shall see, enhance the challenge-based and imaginative immersion of games, contributing to new formal and narrative structures for games and play. But first we need to acknowledge some of the difficulties faced by the designer of scent for games.

Spice Chess

Spice Chess is one of the few games in which scent is so intertwined with gameplay that the moment-to-moment game state can only be fully known through smell. *Spice Chess* is one of a number of modded chess sets created by Fluxus artist Takako Saito in the mid-1960s (Pearce 2006) (Fig. 12). Saito replaced the traditional chess pieces with identical vials containing 12 different aromatic spices, retaining the chessboard. The effect of this transformation is that one can only identify the pieces by smelling them: white pawns were cinnamon, white rooks nutmeg, white knights ginger, the white queen anise, and so on. Before starting a game, players have to spend time learning and memorizing the odors. During play, the game takes on an intimate quality that is unlike a more traditional chess match: “Each player holds the scent-bottle pieces carefully, even intimately, sniffing them to determine their identity and then to move them accordingly” (Higgins 2002, p. 43).

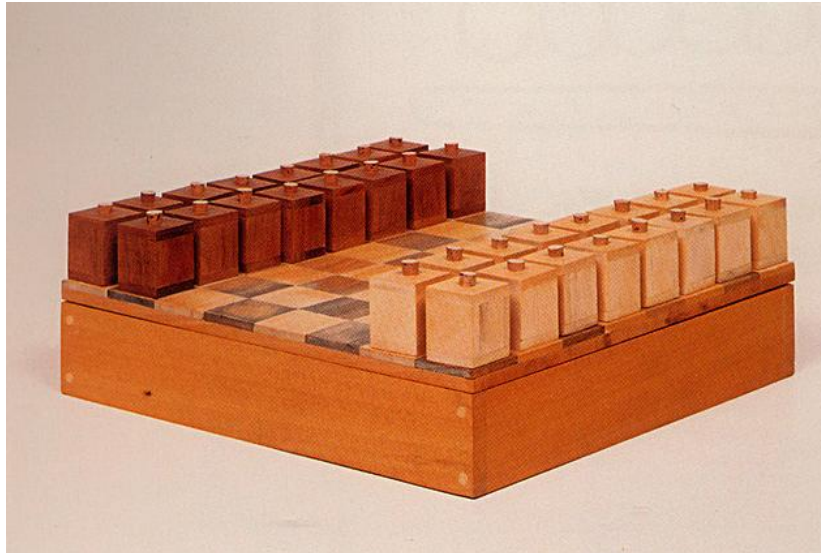


Fig. 12. *Spice Chess*, Takako Saito. Other variations were created, but I believe this version best represents the concept.

An analysis of *Spice Chess* can provide a few key observations regarding how to design novel forms of sensory interaction. First, *Spice Chess* works by overlaying scent on a familiar game form. Our knowledge of how chess works is leveraged, allowing us to focus on the sensory element of the game. Secondly, it can be argued that—as they involve a radically novel mode of interaction—smell games are inherently pedagogical games. As with *Green Aria*, *Spice Chess* incorporates an initial learning period, in which the players must familiarize themselves with the palette of spices to develop associations that keep them informed about the game state.

Challenge-Based Immersion and Odor Discrimination

Being able to discriminate between different odors (such as the odors of the pieces in *Spice Chess*) is harder than it sounds, and provides the most basic challenge for many scent games. The Japanese incense ceremony, or *kodo*, is a sociable pastime in which different incense blends are sampled in a trial run, shuffled, then resampled and identified. Beginners start by having to identify three different kinds of incense; at a higher level one must be able to discriminate four or more kinds:

Shochikubai was succeeded by a more difficult game. The first round was again a *tameshi* (trial run): ... But the second round included an unknown scent, called *fune*, “the boat,” mixed in with the previous three. When our answers had been duly recorded, the secretary announced that no one had recognized all four scents in their correct order. We were ranked according to how many scents were correctly identified. (Gatten 2006, p. 341)

An interactive version of a simple smell recognition game was experienced as similarly challenging: “Even though we had devised the mini-game *Collect Me* to be simple, players found even this introductory game remarkable hard. For players to simply grasp that the game relied on olfactory skills turned out to be difficult, due probably to its unfamiliarity” (Davis et al. 2007). Ermi and Mäyrä define challenge-based immersion as achieving “a satisfying balance of challenges and abilities” (p. 7). Given, as we have seen, that individual smell abilities are highly variable, the unfamiliarity of smell-based interaction means that designers need to keep smell-based game challenges very simple. One of the essential tasks of designing smell into games is to help players develop a basic smell connoisseurship adequate to the challenges of the game, and to support them as they hone “specific cognitive skills, namely learning new mental categories, and how to fit new smells into them” (Gilbert 2008, p. 11).⁵

Imaginative Immersion and the Nordic LARP

The potential of smell to support imaginative immersion in games has perhaps been most fully explored in the Nordic Live Action Roleplaying Game (LARP).LARPs take place in real space, so smell ambience is a given. Examples such as *Dragonbane* (Koljonen, Kuustie and Multamäki 2006) demonstrate how scent design can support the various levels of the game fiction: world, plot and character. *Dragonbane* was a fantasy game involving a large animatronic dragon played on July 27th – August 4th, 2006 in Älvdalen, Sweden. The game featured a scent chemist, who:

made dozens of different scents intended to support things that were visible in the world. These ranged from the smell of decay from the battlefield, the scent of cinnamon and camphor from the hut of the village healers, through to the dreadful and sickening stench used to express the witches’ curses. The witch players themselves were surprised at the power of this effect in emphasizing magic. (p. 99)

Here we can extract a number of discrete contributions of scent to fantasy. First, scent is used to establish the physical environment and to set up specific spatial associations. The smells of cinnamon and camphor—healing and cleansing agents—

waft from the hut of village healers. Secondly, scent is a marker of action and plot, serving through the odor of decay to testify to the aftermath of battle and killing. Finally, scent functions in a performative manner to enhance the power of witch characters:

Witches could lace their potions and ritual spaces with seductive or repulsive odors, creating an immediate physical response in nearby players. The swamp witches heroically acclimated themselves to a retch-inducing stink by dripping it on their clothes, making their presence distinctly unpleasant to all other players – generating a non-stop cavalcade of dramatic and entertaining scenes. (p. 106)

The visceral response to the noxious witch scents was stunning. According to LoveErsare, a witch player and coach, “*At least one person vomited only by standing close to me ...*” (p. 106).

Imaginative Immersion and Perfume Aesthetics

Smell can seduce as well as revolt. Perfumery is one of the few scent design practices that has a history and established discourse, and it seems apt to draw upon it when generating strategies for designing scent for digital entertainment.⁶ Imaginative immersion—for Ermi and Mäyrä—refers to the player’s absorption in the world and fantasy of a game, and there are a number of ways in which perfume can compliment this sort of involvement. Perfume is emphatically something “put on.” Whether applied to represent ourselves to others, or for our own comfort, perfume allows us to play a role, and thus participates in the mimetic quality of play and fantasy (Callois 2001). Perfume also has a temporal character. As with many narrative forms, a perfume wearing exists in time with a beginning, middle and end, experienced, progressively, through the perfume’s topnotes, midnotes and basenotes. Finally, there are the playful uses to which we put perfume: “Envisioned as a game of seduction and love, a game with the attendant ideas of play, luck, risk, victory, and failure, perfume can be seen as a metaphor” (Stamelman 2006, p. 270). The substrate of perfume is skin, and the experience of perfume is impossible to consider apart from the body and its mutability: “many contradictory forces, it may be suggested, coexist in a scent: humanity and animality, spirituality and materiality, beauty and corruption.” (Stamelman 2006, p. 299). These extreme contrasts in materials and references make perfume a metaphor for a range of possible stances towards the body. We can accordingly learn lessons on how to integrate scent into games by looking at how people organize play around perfume.

Playing with Perfume: Perfume Themes in Games

Games with perfume themes explore smell as a site for challenge and fantasy. In his 1944 *Jeu des Parfums*, graphic designer and illustrator Raymond Savignac created a board game that, like *Spice Chess*, roughly overlays a scent theme on a well-known game form, in this case *Snakes and Ladders* (Fig. 13). Composed of a spiral of 45 squares, each devoted to a specific perfume, and played with a pair of dice, the object of the game is to be first to reach the end. Land on certain squares and you are penalized (*Poivre*, for example sets you back 7 squares); other squares shoot

you forward (such as Lancome's *Flèche*). Saignac creates a miniature graphic identity for each perfume, making each as visually memorable as the scent is unique. Just as *Snakes and Ladders* fulfils a basic pedagogical function by instructing children in counting (Salen and Zimmerman 2004), the challenge of *Jeu des Parfums* lies in teaching elementary perfume connoisseurship: "This clever and sophisticated game, like most parlour games, serves to entertain and instruct" (Stamelman 2006, p. 272).



Fig. 13. Saignac's 1944 *Jeu des Parfums*. Source: Stamelman 2006.

Axe's *Maneater* (Unilever 2009) is a marketing game for Dark Temptation fragrance (characterized by a chocolate note) that takes its eating literally. In this side scroller (Fig. 14), one plays the part of a chocolate man avatar seeking to evade a horde of women who are attracted by the scent. The longer one survives, the more clothing the women remove; fall, and one is treated to a God's eye shot of being torn apart and consumed by the ravenous pursuers (Fig. 15). The representation of fragrance in the cutscenes of *Maneater* is reminiscent of *Discworld Noir*: the chocolate odor of Dark Temptation warms up the visual environment with a reddish hue. The airborne, transformative nature of the scent is communicated by the very obvious fan breeze, and the deep sniff of the model (Fig. 16).

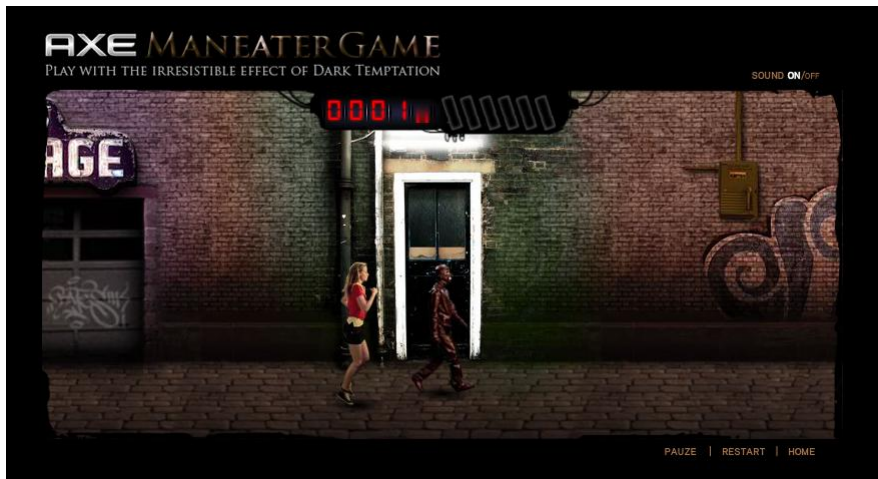


Fig. 14. Maneater is a side scrolling advergame for Dark Temptation cologne.



Fig. 15. Falter, and it's game over.



Fig. 16. Catching a whiff of Dark Temptation.

Although *Maneater* is a delight to analyze from any number of perspectives, what is salient here is that the game represents a reversal of accepted cultural fragrance attitudes. According to Classen et al. (1994):

It is a commonplace in the West that women are the perfumed sex ... Men are the pursuers of women ... and as such there is no particular need for them to enhance their attractiveness. It is women's duty, however, to exert themselves to appear attractive to men, attractive enough to be pursued and chosen. They are prey who must leave scent trails for their hunters. (p.162)

The sort of play that goes on in *Maneater* is more than just honing jump reflexes; men are invited to play at role reversal, being pursued, and ultimately subsumed by female pursuers. Male identification is invited by the game representations, in which the male avatar figure is an abstracted chocolate man pursued by photoreal and highly detailed women pursuers. A perfume game in this case encourages fantasy about gender and identity, though it does not provide equal opportunity for play.

Playing with Perfume: Fragrance Play in an Online Community

Questions of gender and identity related to perfume use are frequent topics of discussion in online fragrance communities. A number of communities have sprung up in recent years (*Makeup Alley* and *Fragrantica*, among others), affording a new media venue for the sort of solidarity and corporate fragrance enjoyment that was a hallmark of Roman culture (see above). *Basenotes.net* is a community that started as a Yahoo discussion group for men about 10 years ago. Though women now participate in the site, the threads in the men's fragrance discussion forum still outnumber those in the woman's forum by about 4:1. The site consists of perfume reviews, discussion fora, and sales/swap fora. Aficionados of perfume gather at *Basenotes* for many reasons—to discover new fragrances, seek advice from other members, share their experiences, sell and swap perfumes, and socialize; and one of the ways the members of the site socialize is through fragrance games and other forms of playful behavior.

Games and playful behaviors in the *Basenotes* community take several forms. Some games pose the basic challenge of quizzes, rewarding connoisseurship about fragrances. In one “guessing game,” a member offered a bottle of perfume to the first member who could, based upon the fragrances listed in her wardrobe, guess her favorite top, middle and basenotes (that is, the individual fragrance materials that she liked best: in her case, bergamot, iris, and vanilla). There are also games that test members' knowledge of perfumes by listing the note pyramid (a description of the ingredients of a perfume expressed as topnotes, midnotes and basenotes), and seeing who can identify the fragrance in question.

Fragrance games on *Basenotes* are often structured around important features of the site: members' “wardrobes,” a listing of the fragrances owned and worn by each member, and the Scent of the Day (SOTD) feature, which allows members to post the fragrance they are wearing on a daily basis. In a game that evolves into a sort of communal scent dressing, players in a thread are invited to choose the SOTD for the member posting above them, based upon that person's wardrobe of scents. This sort

of game feeds fantasy, allowing others in the community to determine the role one will take on for the day. Many of these games play off of the affordances of threaded posting, giving the member the opportunity to demonstrate their fragrance knowledge and sharp wit, or simply contribute to a convivial exchange.

Heuristics for Designing Scent for Games

Involving communities that actively care about the sense of smell, and have developed their own playful activities, is just the first of a number of recommendations for game designers who want to work with this form of novel interaction. These are interesting times in which to design scent for digital entertainment. The lack of a commonly available platform for scent in digital games is an opportunity, affording creative space in which to extract design heuristics and craft gameplay concepts that can express desired futures, rather than being driven by tech development cycles.

First, as we have seen, the sense of smell is not an overrated sense, and many players are (rightfully) sceptical about the motives of those who seek to foist off new technologies that may not improve gameplay. This calls for the designer to move beyond naïve notions of immersion, which, in the case of *AromaRama*, meant that smell merely confirms what is seen or heard. Instead, smell ought to be designed into games as a separate mode (as in *Discworld Noir*) and/or employed in such a way that it provides unique sense information, testifying to elements of the game world that are visually absent or occluded. We must acknowledge, however, that games that seek to actively involve the sense of smell in gameplay will be perceived as challenging, and it is useful to conceive of any game involving smell as a mode of interaction as a pedagogical game. The scent challenges in games should be kept simple. Rather than seeking to establish the “meaning” of a scent in relation to what is seen on screen (the pitfall of naïve immersion, complicated by the difficulty of synchronizing visual and olfactory stimuli), or seeking to draw upon the inherent “meaning” of scents (rendered nearly impossible by the great individual and cultural variability of scent associations), the designer ought to plan to establish scent associations within the game itself, and view the game, essentially, as a learning system. Leveraging existing game forms is another means of introducing players to new forms of scent-based interaction.

The physical limitations of smell sensing, and the previous experiences of those working with scent in the area of Human-Computer Interaction (HCI), counsel designers to be judicious in the quantity and qualities of scent that they employ. Less is more when it comes to scent. Strategies that could be productively employed by the game designer include the use of a single “signature” scent for a game, to create lasting associations in the player’s mind (as with Kojima’s proposed “stench of blood”). Once multiple scents are employed, sequencing and transitioning become a challenge, and the relative slowness of the sense of smell makes it, as Kaye notes in his survey of scent in HCI, most appropriate for slow-moving, medium duration data (Kaye 2004). The persistent nature of odor makes it also well suited to ambient display, as sense information that can remain in background awareness, coming forward as necessary when cued. Due to wide variation in individual sensing and preference, as well as cultural differences, any scented element that is to be

perceived as positive or pleasant in digital entertainment needs to be tested extensively; otherwise, games seeking to invoke positive associations of scent should integrate customization, wardrobes, trading or collecting as game mechanics. Great individual variation in the perception of scent and scent preferences means that smells may not be well suited to employ as part of fixed reward systems in games.

Experimental Gameplay Themes Related to Smell

The purpose of this study is to use multiple theory triangulation generatively in the service of game design, particularly as a means of moving beyond conceptions that would limit smell to a supporting role in naïve immersion. Besides general design heuristics, we can speculate about specific scent themes that could be integrated into experimental gameplay. The first concept below is independent of a specific platform, while the second and third outline physical games based on existing scent technologies.

A. *Sillage*: Longing for the Absent

Sillage is a perfumery term that comes from the French word for the wake left behind by the passage of a ship, and refers to the tendency for perfume to persist in the air after the wearer has departed. Through *sillage*, perfume testifies to an absence. *Sillage* is also a key device in some of the most notable literature that takes perfume as its subject. In both Calvino's *The Name, The Nose* (Calvino 1972) and Proust's short story *Another Memory* (Proust 2006), the sniff of a distinctive and delectable perfume sets the protagonists off on an obsessive quest after characters that are never met. In the case of the Calvino text, three parallel plots all end with the discovery of the dead body of the fragrant beloved.

This ability of scent to provoke deep longing for the absent could be of particular power if applied to game genres in which visual knowledge is frequently withheld. We have seen that the sense of smell is another way of knowing for cultures that are rooted in landscapes in which sight is thwarted. Our survey of scented games also turned up examples in which we learn about absent characters from their smell (*Leisure Suit Larry 7*), and in which scent provides traces, clues to be followed (*Discworld Noir*). Moreover, perfume maintains many links to corruption and death. Bataille's writings on flowers make clear the connection between the ideal and the corrupt, and it has been frequently noted that the volatile scent molecules of jasmine and feces are both largely composed of the same elements (Stamelman 2006). This aspect of scent could be of great value in horror games.

B. Skin Games: Scent and Intimacy

In the introductory paragraph we met a chap who was painfully aware of how his "Kinect smell" might affect his chances to score at a party. This social anxiety represents a huge opportunity for the design of scent in games. There is a whole

genre of party games that exploits social anxiety by forcing people into intimate postures: *Pass the Orange*, for example, a party game in which an orange is passed under the chin from person to person without the use of hands. *Twister* is another such game. Imagine how much more effective this sort of game could be if it involved the added intimacy of smell and contact with the skin.

Scratch Me, Sniff Me is a Scratch-and-Sniff game that is overlaid onto the form of *Twister* (again, leveraging a familiar game form to introduce a new scent interaction). In this game, adhesive color-coded Scratch-and-sniff patches containing a range of smells are applied directly to the body. A spinner would determine the patch to be scratched and sniffed, and placement of the patches would involve its own calculations (Fig. 17).



Fig. 17. *Scratch me, Sniff me* is played with a spinner and color-coded adhesive Scratch-and-sniff patches. (Drawing: Tina-Marie Whitman)

C. Abuse, Power and Transgression

Finally, designers ought to be mindful of the things that the sense of smell does uniquely well. There are particular emotions—underexplored in games—that can be conjured up via odor. Smells can make us want to draw closer through attraction and arousal, or recoil with disgust (Lieberman and Pizarro 2010). Experimental gameplay could fruitfully explore the transgressive nature of scent through the evocation of disgust, for example. Furthermore, smells by their nature “tend to escape and cross boundaries . . .” (Classen, Howes and Synnott 1994, p. 4). In their argument in favor of “abusive games,” Wilson and Sicart propose a category of games that are manifestly difficult, unpleasant or unfair, and suggest that these games can call power structures into question (Wilson and Sicart 2010).

One design strategy for exploring the transgressive possibilities of smell is to evaluate game equipment for its abusive potential. Scratch-and-sniff is an ideal platform for abusive games, as the Scratch-and-sniff card has a power relationship between the designer and user directly inscribed on it (it is the user of the card that holds the power to sniff at will, but implicitly agrees to submit to the designer—this relationship is made explicit in text on cards that make it clear that you should not

use the card until prompted (Fig. 18)). This implied relationship could be made more explicit in an abusive game.

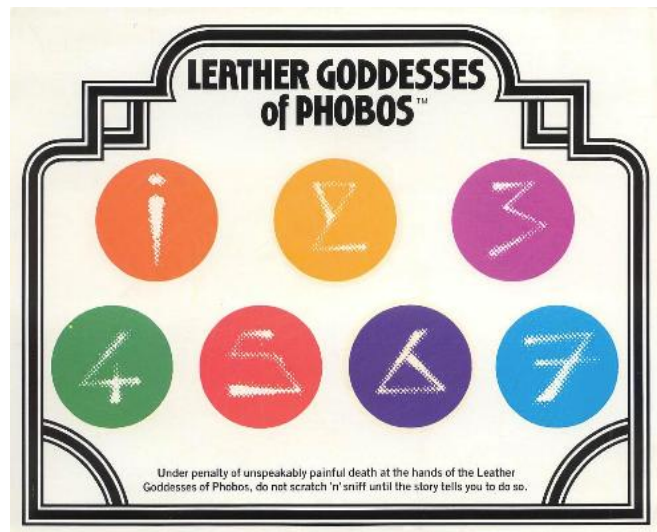


Fig. 18. Scratch-and-sniff card from Leather Goddesses of Phobos. Note the text urging the user to refrain from sniffing until prompted.

Smell research itself can provide additional inspiration to the abusive game designer. "Following a scent trail" would be an excellent concept for an abusive smell game. People assume that dogs have a much better sense of smell than we do, but the fact is that we don't really try very hard (Gilbert 2008). It is possible for people to learn to follow a scent trail effectively; in one study (that looked at how human nostril placement contributes to scent location), people were able to learn to follow a trail of chocolate essential oil through a field (Porter et al., 2007) (Fig. 19).



Fig. 19. Comparing dog and human scent tracking.

This is a simple challenge that ought to be well suited to a smell game, but, as the photo above suggests, there is also something humiliating about donning the sensory deprivation equipment that forces the human subject to focus exclusively on smell. An abusive smell game with similar gear could raise questions about the lengths to which researchers and their methods compel us to go in order to learn about ourselves.

Conclusion: Multiple Theory Triangulation

The purpose of multiple theory triangulation in this study is not to focus attention on a single point, but rather to use several interpretive frameworks to delineate the facets of a complex phenomenon: scent in games. “Following a scent trail” is a case in point. A scent tracking experiment might inspire a game with a simple competitive challenge; the same experiment could also prompt the creation of an abusive game that instructs in power relationships as it delights (or offends) the senses. A sensory anthropologist looking at scent tracking might contribute a third insight to new gameplay. The other gameplay themes—*Sillage* and *Skin Games*—explore facets of scent related to intimacy and the sense of longing. Through the extraction of gameplay themes from a range of game artifacts and play behaviors related to scent, this study aims to produce research for design. According to Peter Lunenfeld, the purpose of “research for design” “is to create objects and systems that display the results of the research and prove its worth” (Laurel 2003, p. 11), and the implicit argument of this study is that gameplay scenarios can also constitute the sort of speculative “objects” that demonstrate design value.

There are several arguments that have been offered in favor of conducting multidisciplinary research. The first is that it tends to produce more robust research results: “the multi-perspectival practice of combining different research approaches is generally considered to be one of the key ways of increasing the reliability and applicability of findings” (Mäyrä 2009, p. 319). With specific reference to games, multidisciplinary research practices are seen as particularly fitting to the object of study: “since games involve both representations and actions, both variously coded structures and their actual instantiation during the performance of play, there is an inherent need for multi- and interdisciplinary collaboration in the area of game studies” (Mäyrä 2009, p. 319). Finally, from the perspective of design, multidisciplinary collaboration has traditionally been thought of as more likely to lead to innovative outcomes, and more sensitive to phenomena that might fall through the cracks between academic disciplines and the various scientific and artistic cultures of research and practice (Harris 1999).

Over the past decade, game studies research has emerged as a practice that draws upon the energies of a number of academic disciplines, so it is fitting to suggest that we might advance the future of smell design in games by adopting a number of the perspectives that have already been applied within our discipline, in order to scrutinize a single sense and its relationship to games and play. The perspectives of sensory psychology, sensory anthropology, media history, plus studies of individual games as well as networked communities, help to create a fuller picture of the significance of smell, and ultimately support game designers who can discern the relevance of, and be inspired by anything related to scent. The heft of a rosewater-

filled egg in the hand, the self-consciousness of a sweaty Kinect player, the anise scent wafting from an unmarked chess piece, the fragrance aficionados who dress one another in scent from afar, the campy humor of a Scratch-and-sniff fart, the night spent skulking through Ankh-Morpork in werewolf mode in search of a particular perfume, and, finally, struggling with the mysterious and powerful manner in which our noses work: all of these are of value to the game designer interested in expanding our sensory experience of play.

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Notes

- ¹ I fabricated several rosewater-filled eggshells for the presentation of this paper at the Digital Games Research Association (DiGRA) 2011 Conference in Utrecht, Netherlands in September, 2011. The eggshells, when full, feel very well balanced in the hand. Our experience was that, upon breaking, the rosewater scent is relatively subtle. I also had my wife throw one at me, hard, and found that it hurt less than expected. It felt similar to being hit by a water balloon.
- ² The *Wall Street Journal* described the distribution, synchronization and sequencing advances in the scent projection system: it centered on: "steel canisters, each containing scented crystals with different odors ... Computer-operated valves force compressed air through the canisters to release a sequence of scents, which flow from the box through plastic tubes and eventually waft out of the scent microphones attached to each seat. Periodically, the microphones ... release a gust of unscented air to clear the nasal passages" (Alter 2009)

- 3 As a low-tech scent medium, Scratch-and-sniff remains an accessible and easy-to-learn means of embedding scent, and it is still popular among rubber stamp hobbyists, who use embossing powder as their encapsulation medium (often with fruit-flavored powdered drink mix as the scenting agent). One could of course employ a much wider array of scents, and Scratch-and-sniff is a scent technology that continues to hold great promise for gameplay.
- 4 In the design document for *Leisure Suit Larry 7* (Lowe 1996), it states that the player is prompted to smell the fish grid at this point. This appears to be a mistake, however, as the image indicates that it is perfume that is cued. As it stands, then, the only oblique reference to sexual smells in this makeout game is the "musk" smell that is prompted in the "beaver hold."
- 5 Being programmatically exposed to scents, learning to remember and discriminate between them, is also the pedagogical approach used to educate perfume designers. The Givaudin method involves learning these materials using a matrix approach: "Imagine a grid of rows and columns. Each row is a fragrance family: citrus, woody, spicy, and so on. Each column is a training session. In the first session, students smell column-wise one material from each family: lemon oil, sandalwood oil, and clove bud oil, for example. ... This process continues for about nine lessons, by which time the students are familiar with the olfactory differences between families. Now comes the hard part—learning the "contrasts" within a family. Each subsequent session traverses one row of the matrix. In the citrus lesson, for example, students smell lemon, bergamot, tangerine, mandarin orange, blood orange, grapefruit, and lime. The goal ... is for the student to create a personal impression of each ingredient" (Gilbert 2008, p. 11)
- 6 And yet, nothing could seem more ill suited to the consideration of gaming than perfume, with its connotations of the fashionable and the effete. What could the figures of the dandy and the stinky gamer possibly have in common? One similarity is that both are apparently unfazed by strong body smells. "Dandified" fragrances, in perfume parlance, are characterized by reliance upon "animalic" notes originally derived from mammal musk glands. Prevalent throughout the history of perfumery, specific musk elements contribute a note that perfume critic Chandler Burr describes as: "the rich, thick scent of the anus of a clean man combined with the smells of his warm skin, his armpits sometime around midday, the head of his ripely scented uncircumcised penis . . . and the sweetish, nutty, acrid, visceral smell of his breath (Burr 2007, p. 249). The difference between dandy and gamer is, of course, that the dandy consciously applies this fragrance to his body, as it is held within a complex composition.