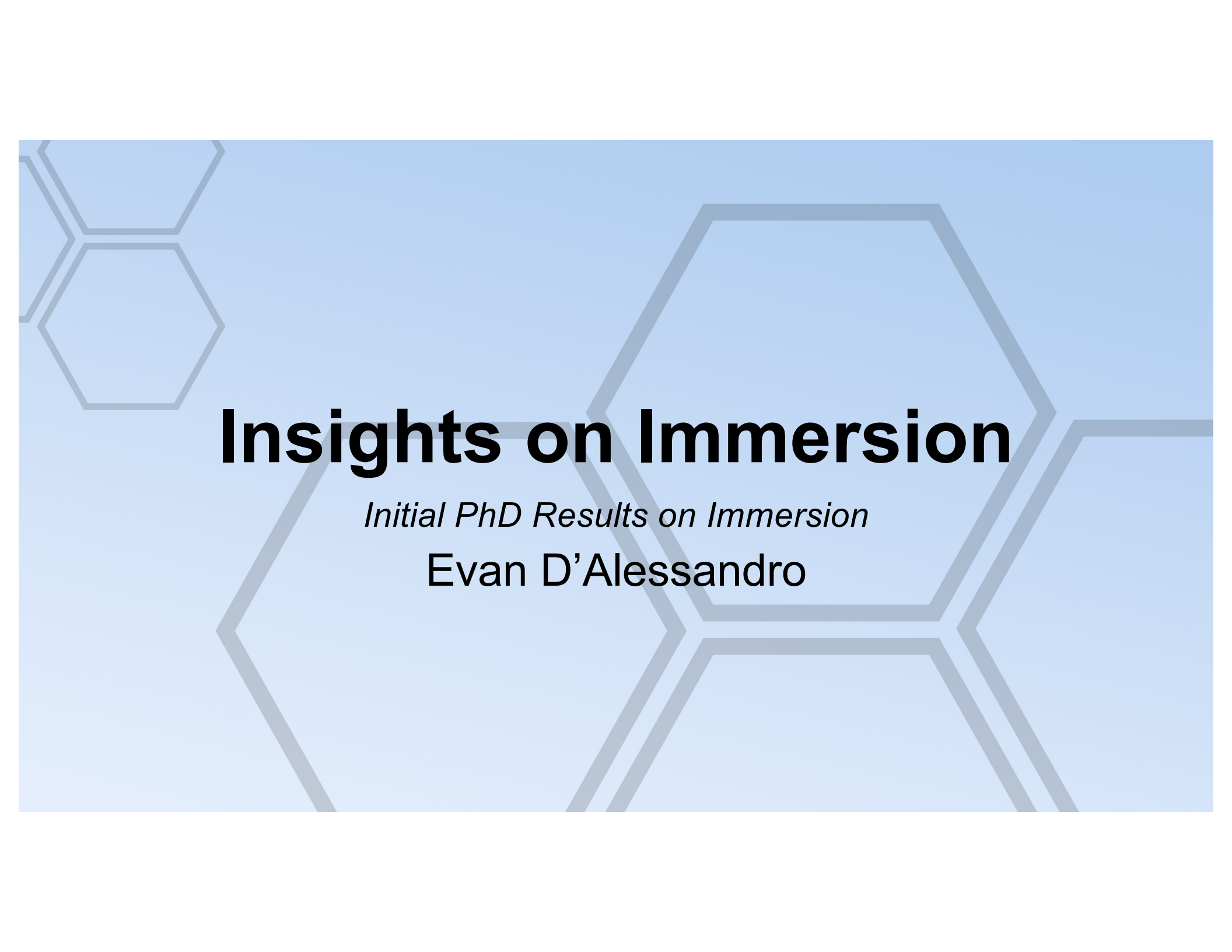




Insights on Immersion

Initial PhD Results on Immersion

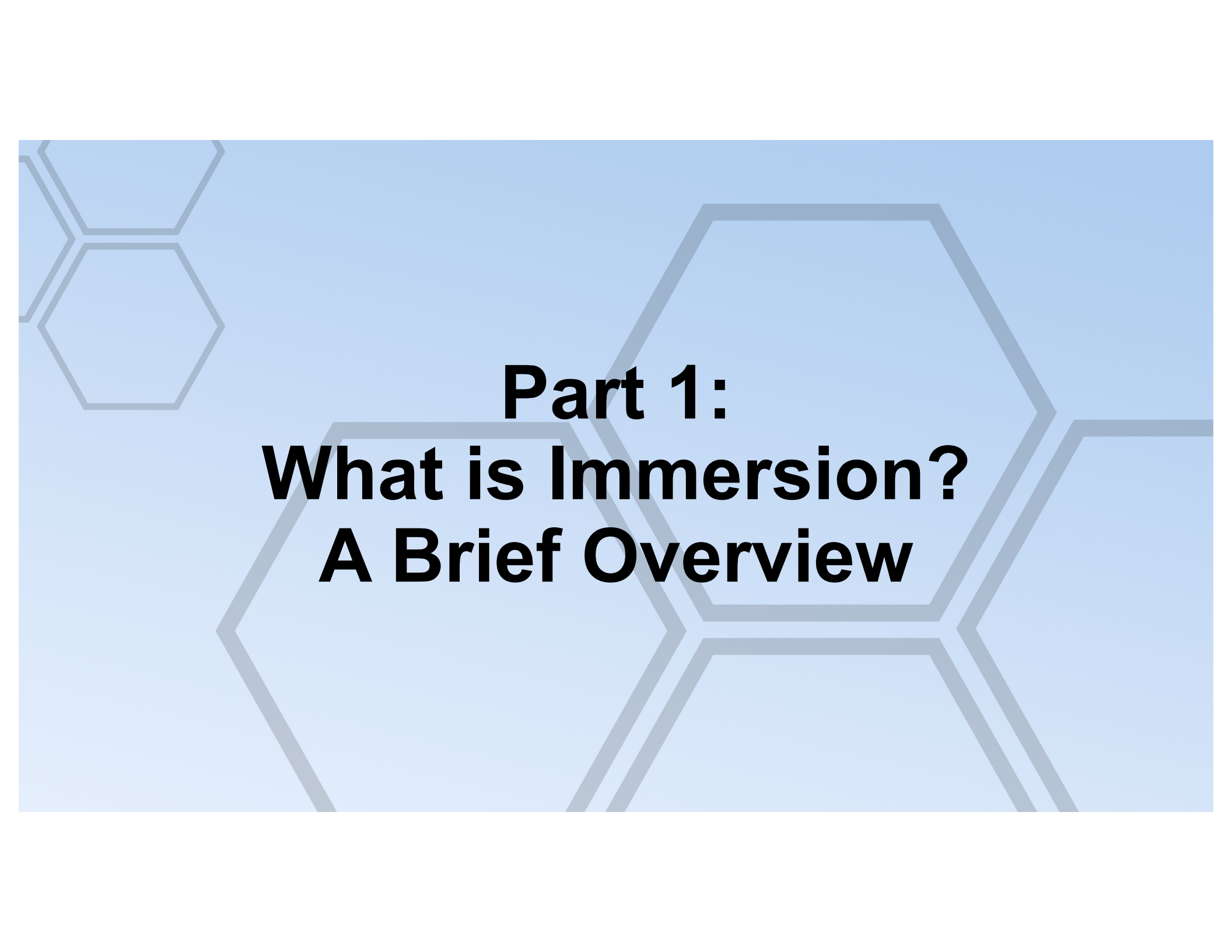
Evan D'Alessandro

Intro to the Research

- Who am I?
 - Both an Academic Studier of Wargaming + a Practitioner of Wargaming
 - PhD student at King's College London studying Immersion in Professional Wargaming
 - I design many games and help run many games (NATO, academic groups, MOD, etc.)
 - Portfolio: <https://evandalejandro.com/>
- Research
 - This is based on three years of research
 - Today is a top level discussion, more detail is present in the PhD.
 - All presented things are subject to change!

Today

- We are going through about 1/4rd of the findings (I only have 45 minutes!):
 - Not covering the “Average Immersive Experience”
 - Not covering the interrelation of immersion elements
 - Not covering overall evidence of the theory
 - (Don’t) worry, I’ll be back to talk about those two next year(s)
- We are covering evidence on What Immerses People?
 - Bit more in the weeds than previous years...
- The Plan:
 - Brief overview of Immersion
 - Brief overview of the Data
 - What immerses people?
 - Q+A



Part 1:

What is Immersion?

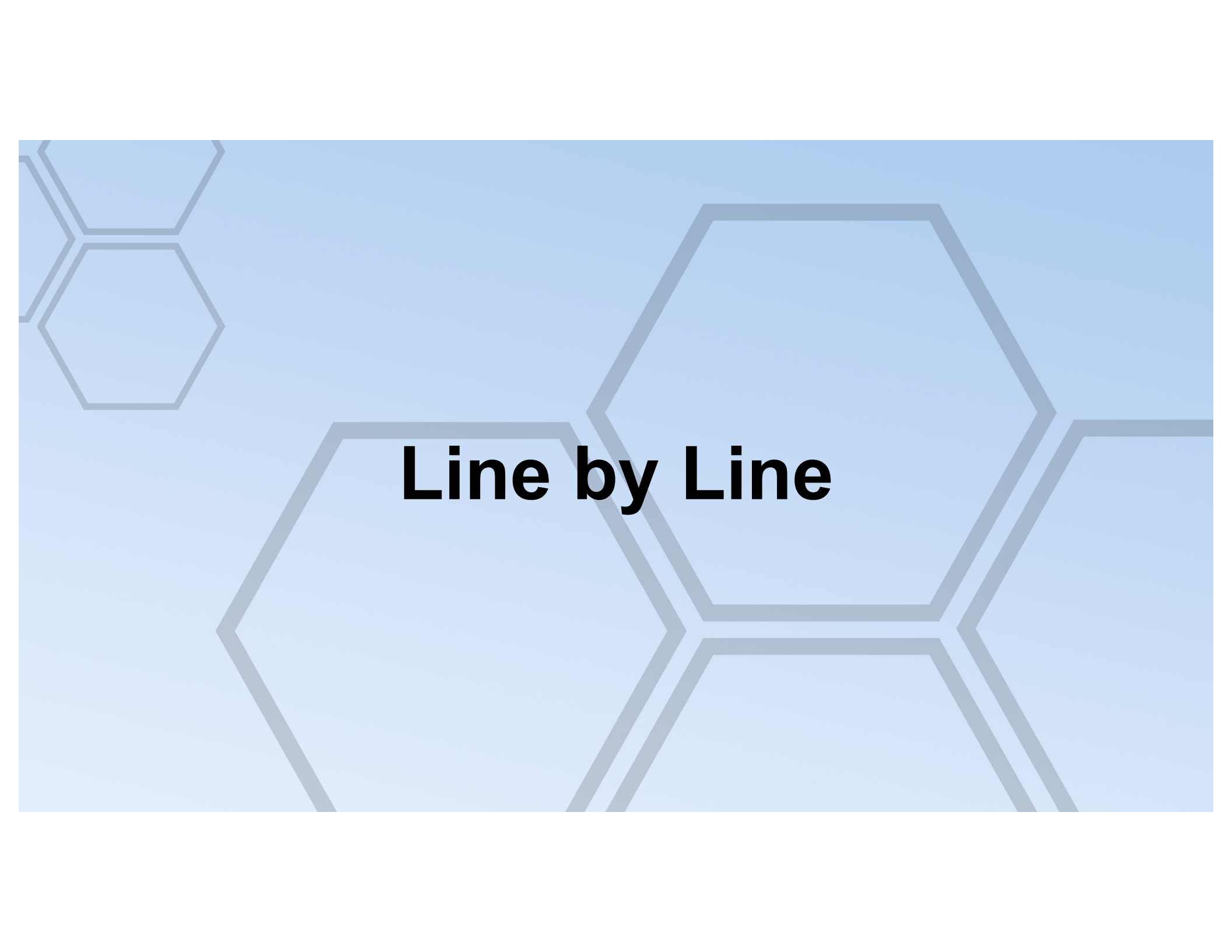
A Brief Overview

What is Immersion?

- Complex Question
 - Lots of factors involved
 - Lots of disagreement
 - Presence
 - Flow
 - Fun
 - Cognitive Absorption
 - No wargaming literature
 - Lots of competing ideas (presence, real world disassociation, engagement, selective attention, cognitive absorption, etc.)

What is Immersion?

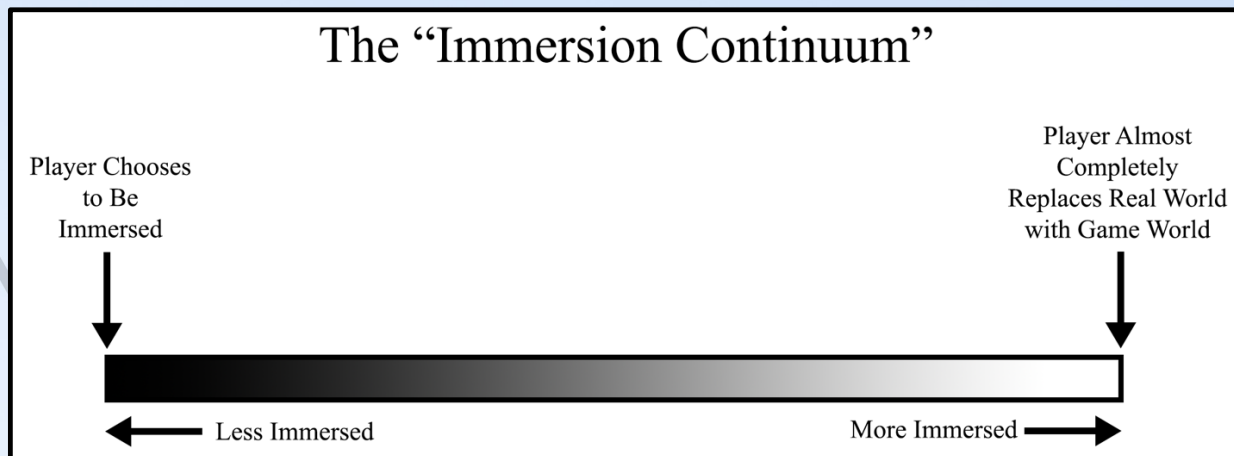
- Immersion is a Continuum a person may choose to exist upon while playing a game
- Immersion is created by barriers, fuel, and distractors
- The experience and expression of immersion is continuously changing
- It is socially mediated
- It is highly individual
- The existence of immersion can be seen in symptoms
- Special meanings are the unique symptom indicating the existence of immersion



Line by Line

Immersion is a Continuum, a person may choose to exist upon while playing a game

- Immersion is not on/off switch - it is a continuum
- Total immersion is not possible
- Immersion does not start with playing a game, but by choosing to be immersed
 - Immersion $\neq$ magic circle (ludic acceptance is different)
- Well designed games make you more immersed over time



Immersion is created by barriers, fuel, + distractors

3 Components of Immersive Pressure

1. Eliminate Barriers

1. Removing barriers doesn't make someone more immersed, it just means they *can* be more immersed

2. **Example: Graphics**

2. Create Fuel

1. “Fuel is any activity, or the positive qualities, both in the player and the game, that contributes to make the player advance through the degrees of immersion” - Arsenault, ‘Dark Waters: Spotlight on Immersion’
2. Barriers must be removed for fuel to be effective

3. **Example: Space**

3. Reduce Distractors

- Players who are distracted are reminded of the real world + exposed to it again – *they may become less immersed* - **This is how you lose immersion**
- Distraction is immediate, disengagement is not
- Some degree is inevitable
- Reinforcing feedback loop - more immersed players are less likely to be disengaged and distracted, thus more immersed players are more insulated from these effects
- **Example: Hybrid Players**

The experience and expression of immersion is continuously changing

“Immersion is a many-faceted phenomenon with different aspects that can appear and be emphasized differently in the individual cases of different games and players.” - Ermi and Mäyrä

It is socially mediated

It is highly individual

- Immersion is person, group, time, location, etc. specific
 - Each person is different
- Immersion constantly evolves
- It is socially negotiated - the rules and social context around it change
 - What is good for one group is not good for all
 - Students are immersed differently than military officers
- Each instance is unique

The background of the slide is a solid light blue color. It features several faint, grey-outlined hexagonal patterns. One large hexagon is centered behind the text. To its left, there is a smaller hexagon, and further left, a partial hexagon is visible. Below the central hexagon, there are more faint hexagonal outlines, creating a subtle geometric design.

The Symptoms of Immersion

The existence of immersion can be seen in symptoms

- There are 3 symptoms
- Symptom 1 - “Time flies when you're having fun”
 - Losing track of time and disengaging from the real world
 - Overlaps with flow
 - Mostly about real world disassociation
 - Less likely to notice real world concerns (hunger, people talking outside the door loudly, etc.)
- Symptom 2 - Feeling like you are in the game/game world
 - Fragile in board wargames, Video games / VR less so
 - Not just the 5 senses, it is also cognitive - rules that increase realism help players feel in the game world
 - Key: the rules of the game world must make logical sense to the player
 - Easy to see this: players reject the game and the game world, disengaging from an immersive state commenting “this isn't how it is in the real world”

The existence of immersion can be seen in symptoms

- Symptom 3 – Emotion: Identification, Empathization, and Embodiment
 - As the player becomes immersed, they identify with, empathize with, or even embody a character
 - Embodiment = becoming the character
 - You think about it in RPGs and LARPs, but also very common in many games
 - May see the players thinking, talking, or acting more like their respective roles
 - At the lowest level 3rd person - “I don't want my character to die”
 - At higher levels 1st person - “I don't want to die”
 - Changes players decision-making process

It is possible none of these are immersion

- Or at least not wholly unique to immersion
- Could be explainable in some part by other concepts
- Even if these are not created by immersion, they overlap so much that is impossible to disaggregate them
- In most cases increasing immersion, or any other of these concepts would have a positive effect on the others – thus we cannot discount them



The Key Symptom of Immersion: Special Meanings

Special meanings are the unique symptom indicating the existence of immersion

- The distinctive hallmark of immersion
- It is unique and does not appear elsewhere
- It cannot be explained by anything else

The existence of immersion can be seen in symptoms

"When players stop interacting with the elements of the game as if they had no meaning beyond their given value, and instead view them as having their real world meaning."

- Salen and Zimmerman

The existence of immersion can be seen in symptoms

- Base level = very easy to occur
 - A person who accepts the lusory attitude accepts game pieces are not cardboard, but representative
 - This is boring
- Higher levels are more defining of this feature
- Critically: When special meanings occur players will take pieces, view them, and most importantly interact with them as if they were real

The existence of immersion can be seen in symptoms

- **Special Meanings** are the most important aspect of immersion - the more realistically people engage with a game, the better the game you will produce (many caveats apply)



Part 2: The Shape of the Dataset

Where and Who?

- Data collection at:
 - Hobby spaces
 - Professional wargaming conferences
 - Games with students at King's College London + other academic institutions
 - Games being used for professional purposes (both education and analysis)
 - *Implication*: somewhat likely to be representative of the overall nature of the professional wargaming community
- 4 “groups” of individuals surveyed:
 - Professional wargamers
 - Hobby wargamers
 - Those curious about wargaming (with subgroups of professionals and non-professionals)
 - Those who are not interested in wargaming (though minimal)
 - Groups are not mutually exclusive!
 - *Implication*: the sample used applies most closely to people who wish to wargame + becomes less representative of the population.
 - Problem? Most people who come to a wargame end up being engaged by it?

How Many Did I Get?

- 455 surveys collected - Almost all surveys were conducted almost immediately after the end of the game.
 - 84 were solely the Generic Immersion Survey (GIS)
 - 211 were the Competence Survey (a GIS plus a survey of competence change)
 - 160 were the Advanced GIS (the GIS plus an additional set of free response questions).
- Estimated (first order approximation) that there were 584 possible opportunities to collect surveys, yielding a (very approximate) ~78% survey return rate
 - Varies with some games estimated to be as low as 20% survey return rate, and some smaller games at 100%. Typically, lower response rates in games with students.
 - *Implication:* biases the data towards some degree of higher immersion as players who didn't fill out a survey were more likely to have not been engaged by the game
 - *Implication:* Some bias towards those who play games, as those who do not self-select out of the group of people who would attend games and enjoy them.

What Did I Survey?

Game Type	# of Surveys	% of Total
Megagame	287	63%
Rigid Board Wargame	94	21%
Committee Game	28	6%
Negotiation Game	13	3%
Miniatures	11	2%
Unsure of Classification	7	2%
Rigid Board Wargame (Online)	5	1%
RPG	5	1%
Unknown	3	1%
Rigid Board Game	2	0%

- Lack of BOGSATs and free kriegsspiels.
- May bias the data somewhat:
 - *Mitigating Factor 1*: the mechanics of BOGSATs share heavy overlap with Negotiation and Committee games (total N = 40)
 - *Mitigating Factor 2*: free kriegsspiels overlap in mechanical form with many of the games run that employ semi-rigid kriegsspiel techniques or mix in free kriegsspiel with more rigid rules (negotiation, committee, RPG, megagames)

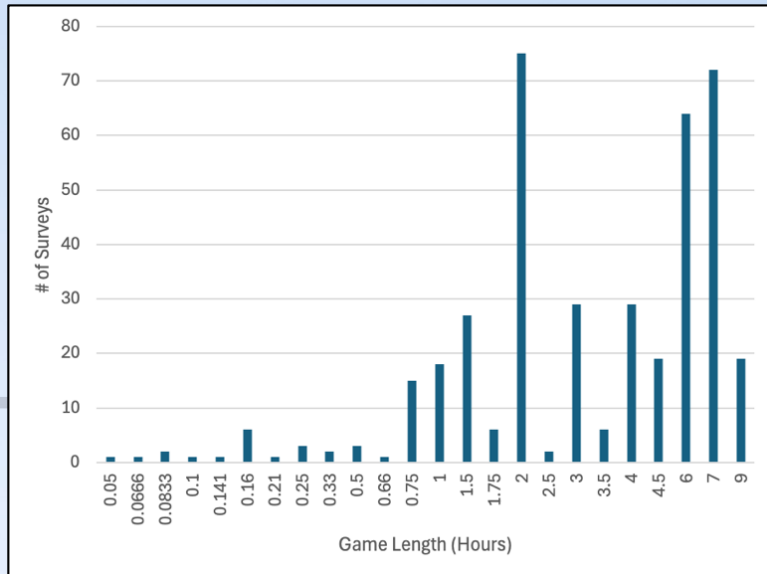
What Did I Survey?

<i>Game</i>	<i>Game Type</i>	<i># of Surveys</i>	<i>% of Total</i>
Jaws of the Dragon	Megagame	176	39%
Horizons 2.0	Rigid Board Wargame	41	9%
It All Falls Down	Megagame	36	8%
My Dear Leader	Megagame	36	8%
Keep it Moving	Rigid Board Wargame	21	5%
FASI Wargame	Megagame	19	4%

Table by game types. One or more runs of each game included. Table truncated at games with 15+ surveys

- Bias towards megagames in the data (as before) – bias towards the specific game Jaws of the Dragon

Gameplay Length

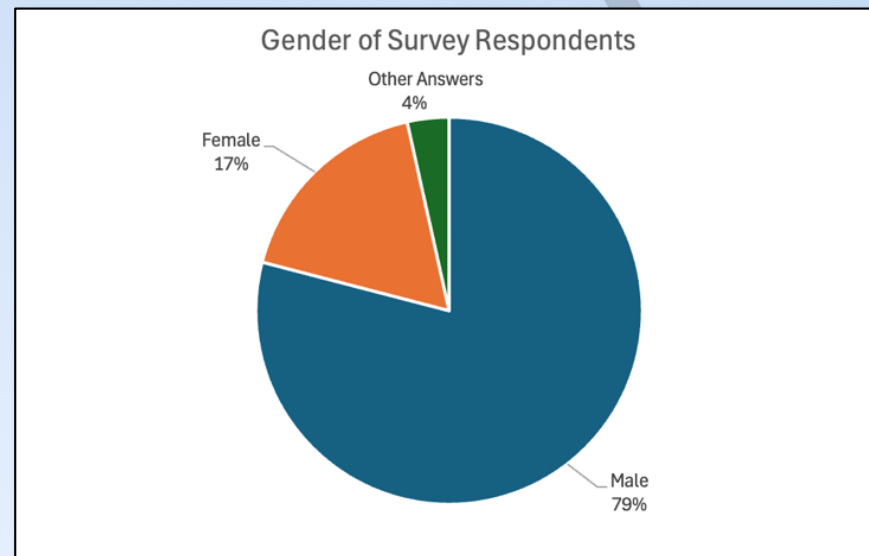


Game Length	# of Surveys
> 30 mins	16
30-59 min	18
1 Hour	4
1.5 Hours	16
1.75 Hours	2
2 Hours	54
2.5 Hours	2
3 Hours	14
3.5 Hours	6
4 Hours	29
4.5 Hours	19
6 Hours	28
7 Hours	72
9 Hours	19

- No disproportionality high values
- The 9- and 7-hour games, these were two different runs of *Jaws of the Dragon*, while the 6-hour section is comprised of runs of *Jaws of the Dragon* and *My Dear Leader*

Gender

- 362 surveys were filled in by men (~80%), and 80 by women (~18%). A further 11 (~4%) were unfilled or had non-responses



Wargame Experience

	<i>Wargaming Experience</i>	<i>Professional Wargaming Experience</i>	<i>Difference (PW to W)</i>
<= 1 Year	217	293	+76
2-5 Years	94	53	-41
6-15 Years	26	30	+4
16+ Years	105	28	-77

- Large number of students surveyed for this study
 - High less than 1 year
 - Also probably driving up the 2-5 years (KCL Crisis Sim gets many return players who play for multiple years)
- Low 6-15 year range for wargaming experience – possibly because many wargamers have been doing this since they were very young
- To disambiguate “less than 1 year” of wargaming experience tried to clarify if this was one of the first wargames they played.
 - Question added to surveys partway through the data collection (302 surveys asked, ~66% of total).
 - 131 (~25% of all surveys collected) left it unfilled
 - 84 (~19% of all surveys) reported the game as being their first wargame
 - 46 (~10% of all surveys) reported the game being their second ever wargame
 - 26 (~6% of all surveys) reported this being their third wargame
 - This data is slightly muddy (some survey respondents clearly misfiled, but not a substantial risk)
- Professional Wargaming Experience
 - Many novices or non-professional wargamers
 - ~37.5% confirmed to have 2+ years of professional wargaming experience (unknown number of <=1 year individuals)

Backgrounds

		<i>Academic</i>	<i>Govt.</i>	<i>Private Sector</i>	<i>Military</i>	<i>Hobby</i>
Male	Total	168	108	103	110	127
	% of Male	46%	30%	28%	30%	35%
Female	Total	47	18	19	5	12
	% of Female	59%	23%	24%	6%	15%

Backgrounds are not mutually exclusive – respondents could check all that apply

- Higher rate of women in the academic category, likely to the higher rates of female students participating in games at King's College London.
- Very few women in the military compared to men, and similarly in the hobby space.
- The lack of women in the military and in the hobby is expected and representative of the professional wargaming community (hopefully getting better over time...) and the players of professional wargames in military (and to a lesser degree) governmental contexts, though this can be highly variable.

Gaming Backgrounds

<i>Game Type</i>	<i>Total</i>	<i>% of Total</i>
Video Games	260	57%
Hobby Board Games	227	50%
Hobby Board Wargames	191	42%
RPG's	157	35%
Miniatures	113	25%
Matrix Games	100	22%
Trading Card Games	62	14%
VR Games	37	8%
LARP's	29	6%
Other Self Listed	12	3%

- Data seems consistent with prior expectations about the broader public:
 - Video games are extremely common.
 - Prevalence of hobby board games consistent in beating out board wargames and RPG's in they are more accessible (due to large sample of non-wargamers and non-professional wargamers)
 - High number of hobby wargames is likely due to the high preponderance of wargamers in the dataset
 - RPG's is likely for the same reason and as they have now broken out into the mainstream in the younger generation, and thus the high number of students in the dataset lead to a higher representation
- Note however that it would have been advisable to have added a Megagame category, both for completeness and as it appears a number of times in the Other category that allowed people to write in other types of games.

Conclusion

- Effects on the Data
 - Overall Player Bias
 - Less likely to represent players who resent playing games (bias towards higher immersion)
 - Less likely to capture players who do not like playing games (self selection bias towards higher immersion)
 - More likely to capture players who had a good time (bias towards higher immersion)
 - Demographic Biases
 - Lower number of women surveyed
 - Large number of students surveyed
 - Many with little/no professional wargaming experience
 - Game Biases
 - Lack of BOGSAT and Free Kriegsspiel (some mitigating factors to these)
 - Bias towards megagames in the data (which seem to be more immersive)
- In conclusion, this dataset, with some minor caveats, seems to be broadly representative of wargaming.
- No obvious lethal structural issues in the data or massive caveats to findings.



Part 3: What Immerses People?

Initial Notes

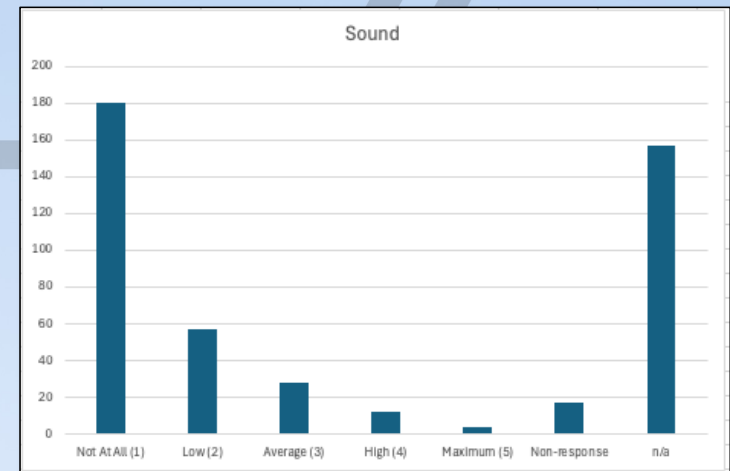
- When I discuss values here, they range from 1-5 (numericized Likert), so a 3 is average.
- I'm only going to report on statistical tests where and when it's important to the point I'm making.
 - Do not expect a detailed stats discussion here!
 - "Statistically significant" = p is less than .05 (if stated as "borderline" p is between .1 and .05)

What are We Talking About Today?

- Sound (Music, Sound, Ambiance, etc.)
- Game Pieces, Graphics, Text, and Briefings
- Space Where the Game is Played
- Emotional Engagement With the Game
 - Overall
 - Characters
- The Level of Challenge
- Your Feeling of Being in the Game World
- The Narrative
- Your focus/attention on the game
- Outside knowledge about parts of the game (topic, mechanics, other players)
- Other Players

Sound (Music, Sound, Ambiance, etc.)

- Of all elements/mechanisms Sound had the worst response rate (62%)
- Scored an average of 1.59 (SD = .93).
- Distribution is on the very low end
- An extremely large proportion (157 people, ~35%) reporting “not applicable” and not giving a response
- Poor showing is a result of the type of games run in that they did not use sound at all
- No real conclusion can be drawn from this data
- The one game that was designed specifically with sound in mind scored quite well (3.8)
 - A planning/ committee game with singing as a specific gameplay mechanic
 - This was not even the highest element (7 out of 10 other mechanisms/elements beating it out for the same game), and with only 5 datapoints it is not sufficient to draw conclusions from



Game Pieces, Graphics, Text, and Briefings: Effects

- Probably too large a group – was going for a “look of the game” idea, but probably not granular enough.
- Scored an average of 3.12 (SD =.92), just slightly over the median of 3.
- “Did the quality of the graphics of the game and its pieces affect your immersion? How?” was asked. These answers were coded which provided the following information:

<i>Code</i>	<i># of Responses</i>		<i>Code</i>	<i># of Responses</i>
Positive Effect	34		Effectual (Unclear Direction)	1
Slight Positive Effect	6		Somewhat Effectual	1
In-between Effect	2		Not Effectual	39
Slight Negative Effect	2		Non-Response or N/A	73
Negative Effect	3			

Game Pieces, Graphics, Text, and Briefings: Effects

- High preponderance towards negative or positive at first glance depending on how one wants to interpret the data.
 - Where players list an effect, the overwhelming majority list it as a positive effect.
 - However, only 55% said that it had an effect, not all of those were positive (44%), and the largest group (73) did not respond or provided a non-response to the question (which may indicate no effect).
- What the data seems to show is that when good graphics are deployed in a game, they tend to impact the immersion of (at least a chunk of) the players in a positive direction.
- However the purpose of the graphics in the game was to have an effect on the player – in many cases (almost the same number as total “positive” effects) the graphics failed to have a substantial effect!
 - Note however that some small amount of the “Not Effectual” response are “the graphics were good, but still had no effect”, and that some of those cases were games that had either bad graphics or technical problems with the game graphics. Slight bias towards graphics being more effective
- Conclusion: A group that this has positive effects on and a group that is not effected.

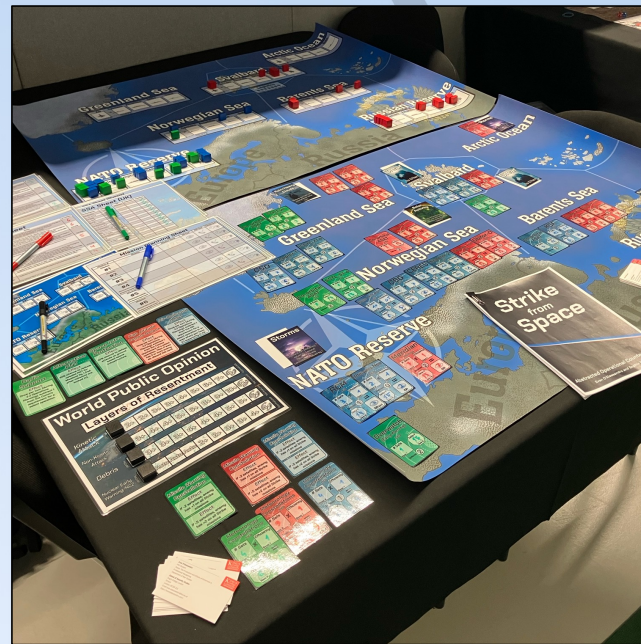
Types of Graphics



Bad Graphics

Dungeon Deck Crawl

Minimal graphics work.



Okay Graphics

Strike from Space

Note the graphics are pretty good, but there is not a level of polish in the game components/printing.



Good Graphics

Horizons

Good graphics, high degree of polish, professional components/printing.

Game Pieces, Graphics, Text, and Briefings: Effects

- What if we break down by how good the graphics are?
- Good and OK graphics are (statistically) significantly different for bad graphics, but not from each other.
- Some indication that good-enough graphics are good.

<i>Game Graphics</i>	<i>Bad</i>	<i>OK</i>	<i>Good</i>
Average	2.85	3.15	3.22
St. Dev.	.95	.90	.92
# of Datapoints	40	226	141

	<i>Graphical Quality</i>		
Code	<i>Bad</i>	<i>OK</i>	<i>Good</i>
Positive Effect	5	15	14
Slight Positive Effect	1	3	2
In-between Effect	0	0	2
Slight Negative Effect	0	0	2
Negative Effect	1	1	1
Effectual (Unclear Direction)	0	0	1
Somewhat Effectual	0	1	0
Not Effectual	15	9	13
Total Datapoints	22	29	35
Effectual Rate	32%	69%	63%
Positive Effect Rate	27%	62%	46%

Game Pieces, Graphics, Text, and Briefings: Causes

- None of these are particular revelations about graphics in board games
- Interesting to see that affordances (“Graphics Improved Comprehension” and “Graphics Unclear”) show up in force.
- The effect of theme does not appear, perhaps because players have “baked in” the effect of theming and anticipate that graphics will be themed.

<i>Effector</i>	<i># of Reports</i>	<i>Notes</i>	<i>Proposed Mechanism</i>
Good Quality Graphics	13	High quality of graphics helped the player	Visual appeal, theming?
Graphics Improved Comprehension	8	Graphics allowed player to understand the game and improved immersion	Affordances
Map/Gameboard	7	Map/Gameboard affected immersion	Visual appeal, theming?
Graphics Unclear	5	Lack of clarity in graphics detracted	Affordances
Game Pieces too Abstract	4	Lack of representativeness of the game pieces detracted	Affordances, theming?
Graphics Too Simple	4	Simplicity of graphics detracted	Visual appeal, theming?
Poor Quality Graphics	4	Low quality of graphic detracted	Visual appeal, theming?

Game Pieces, Graphics, Text, and Briefings: Causes

- Short answer question: “What visual elements of the game/room added to your immersion? Which subtracted?”
 - Out of 160 possible responses, 91 surveys stated that the visual elements had a positive effect, 3 mixed effect, and 7 negative effect.
 - Note large sample of megagames – leading to answers about those types of games (though lots of different graphics here)
 - Note that the % of responses is an undercount as not all games had all elements and thus would lower the numbers compared to the opportunity to have the elements in the game.
- A massive proportion (65%!) of respondents noted the map!
- Even before the game pieces!
- This is probably as games with maps/gameboards are a major focal point for a game (as it is where the action happens) and determinative of the game, and thus demands attention.
 - E.g. unclear if importance spatial or graphical in nature
- Flags clearly are of effect on the player
 - Other visual decorations of the room were also noted (portraits of the Kim Family)
 - Possibly an inexpensive + easy way to add immersion or theme to a game.
- Nametags show up but people don’t say why exactly.

<i>Graphic Element</i>	<i># of Responses</i>	<i>% of Responses</i>
Map/ Gameboard	66	65%
Game Pieces	25	25%
Flags	21	21%
Nametags	11	11%

Answers given more than 5 times.

Conclusions: Game Pieces, Graphics, Text, and Briefings

- Graphics are effectual on the player
- Need good ones, but you don't necessary need amazing ones (though it may externally help with buy in for the wider game)
- Several easy ways to increase immersion here
 - Flags
 - Good nametags
 - Silly hats?
- Inverse conclusion? A certain level of graphic quality is expected by the player?



Some nametags for Jaws of the Dragon

Space Where the Game is Played

- The space where the game is played had an average effect of 2.69 (SD = 1.02).
- This doesn't tell us much, if we want a better assessment we need to split the data into two categories:
 - Games with no modification to the space
 - Those that had modifications made to the space to attempt to be more immersive
 - Ideally we would have a 360° aesthetic option too, but I didn't run any of those games



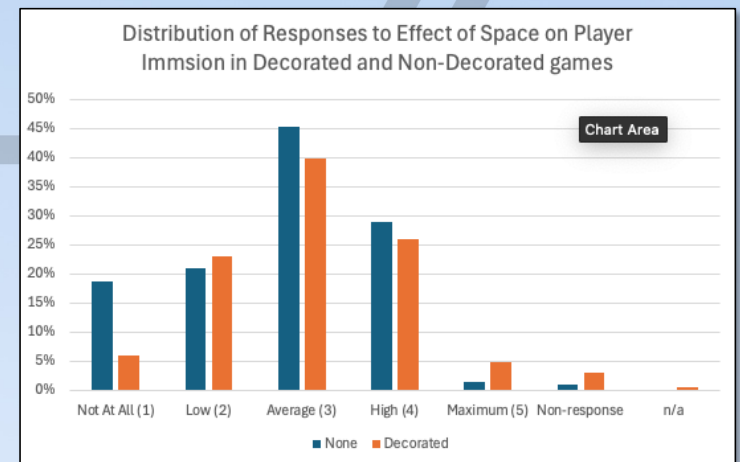
Right: Examples of Decorated Spaces, note that the decoration is pretty minimal, but feels more in practice

Split Space

- Non-decorated games the space had an average effect of 2.49 (SD = 1.00)
- Decorated games the average is 3.01 (SD = .97)
- Difference is overwhelmingly statistically significant
- This seems to show that even in decorated games the effect on players was only average (3)
- Though it is substantially higher than in non-decorated games!

Split Space – Why the Effect?

- The difference in averages is mostly due to a large decrease in “not at all” responses, and a very minor increase in “maximum” responses.
- This would seem to indicate that the effect of space is pretty minimal on average, even in decorated cases.
- This is not to say that space is not largely effective on some people, the high columns both cross the 25% mark in both groups, but rather that on average, it is not producing large effects (very small “maximum” columns).
- What it does show is that if a designer cares about trying to squeeze some immersion from space, even a little work (a few flags!), does go a long way (+.52!).



Visual Elements: Coded Answers

- Short answer question: “What visual elements of the game/room added to your immersion? Which subtracted?”
- 101 surveys
 - 91 surveys (56.5% of possible responses) said that the space was a positive effect
 - 3 that it was mixed
 - 7 that it was negative.
- This large amount of positive responses, with low reported effect seems to indicate that space produces a small, but consistently positive effect.

Space: Coded Answers

- Looking at space, a much lower number of responses were collected in response to space, only 35, which will mean the following is far more descriptive.
- Separate tables/rooms for each team in a game.
 - “The most contributing factor was that each country team was in their own room ... really made it feel like you were interacting with different countries rather than just walking over to your peers in one big room. Things like Canada and France being together also made ‘sense’ due to the real-life countries being close ... while other countries like Taiwan would be far away ... making it having [sic] to walk (or sometimes run) much more evocative!”
- The physical distance of rooms was also described as immersive
 - See quote above
- A central “node” of the game in terms of space
 - The central map table of one run of Jaws of the Dragon being mentioned. (Note previous discussion on the map as a major element in the graphics discussion)
 - The news and speech room that players convened in at the start of every turn of *My Dear Leader*.

Code	# of Responses
Team Rooms/Team Tables	12
Central Map	2
Noisy Room	2
Real Space Breaking Into the Game	2
Room Distance	2

Space: Coded Answers

- Flags are the most common space element described (N=21).
- An overly noisy or busy room is also noted
 - Two players noted that the “real space” of the game was breaking into the game world and lowering their immersion.
 - “However, the university signs & other elements tended to make me realize I was in a classroom and broke immersion.”
- A variety of other factors were mentioned by players, such as the room being too empty, the in-room layout being bad, the layout of different rooms being bad, the room being too small, and the ability to overhear other teams being a negative.

Code	# of Responses
Team Rooms/Team Tables	12
Central Map	2
Noisy Room	2
Real Space Breaking Into the Game	2
Room Distance	2

Conclusion: Space

- Space is a complex phenomenon, composed of at least two major elements:
 - The physical layout of the space
 - The visual effect of the space.
- Possibly also the theming of the space is important to players?
- Set dressing is set dressing (low effort with moderate effect to get to the average) and possibly (with further investigation needed) that if you want a big effect, you may need to invest in a more serious transformation of the space.
 - But this is free immersion, so why not?
- As a possible upper bounding within the data for simple set dressing the highest assessment of space (with more than 5 surveys) in a game was only 3.16

Emotional Engagement Overall With the Game

- Emotional engagement with the game rated a 3.22 (SD = .89)
- The free response question “Were you emotionally engaged by the game? Why?” was asked on the AGIS:

Code	# of Instances	Notes
Wanting to Win	34	Combination of direct statement (N=16) and implied (N=18).
Roleplaying	9	
Engaging (or being ignored) with other Players	8	
Teamwork	8	
Outside Knowledge about the Game Topic	8	Combination of personally engaged with topic and have outside knowledge.
Real World Relevance	6	
Could Not Roleplay because No Character	5	
Wanting to Grab Personal Power	5	Biased, coming from My Dear Leader.
Engagement with other Players	4	
Engaged in Game Process	3	Players engaged in passively watching the implementation of gameplay. Biased, coming from Horizons.
Felt Like Consequences to Actions	3	
Had or didn't have personal power	3	
Became More invested Over Time	3	
Uncertainty	3	(Realistic) Uncertainty in knowing what was going on.

Overall Emotional Engagement Findings

- Massive majority of players reporting that the reason they were emotionally engaged was because they wanted to win the game
- This large number of “wanting to win” responses can be deceptive, and if codes are broken down:
 - 11 Individual Emotional Engagement responses (e.g. engaged by something internal to the person, like “the stakes felt real”)
 - 50 Collective Emotional Engagement codes (e.g. engaged by something external to the person like “other players roleplayed”)
 - 42 Engagement Competition codes (e.g. “I wanted to win”).
 - This seems to show two or three types of versions of “wanting to win”: personal, collective, and competitive, but more research is required.
 - There are sampling effects on this data too, so individual is probably lower than it might be!
- This doesn’t mean that the players were engaged in pure engrossment, many of them listed other reasons, or provided more complex motivations.
- Functionally, this is an indication that players in a game want to achieve their goals, e.g. are experiencing (at least to some level) what I have termed *goal alignment* with their character.

Overall Emotional Engagement Findings

- In the coding elements frequently reported are roleplaying or the lack of roleplaying because they do not have a character (or enough info on their character) to engage with.
- Other players and teamwork were mentioned frequently which would be rated even higher if combined with “engagement with other players.”
- Knowledge about the game topic (to be discussed more later), and the real-world relevance of the game to the world or the player were also mentioned.
- Of interest are some of the codes that have lower numbers:
 - Some players were engaged in just watching the mechanical implementation by the facilitator of the game in Horizons (what Farkas would term Submergence).
 - Having or not having personal power (feeling empowered or disempowered) also affected several players enough to note it, again a well-known phenomena for designers, but worth emphasizing.
 - Several players noted becoming more emotionally engaged over time, as predicted by the theory of immersive pressure, but a further investigation is not possible with only three responses.
 - Finally, and most interestingly, several players reported that a realistic level of uncertainty helped emotionality engage them.

Emotional Engagement With the Characters

- Emotional engagement with characters had a rating of 2.93
- Part of the reason for this lower score may be that there are relatively few games in this dataset that are character centric (LARPs, handful of RPGs).
 - Evidence: Excluding sound this has the lowest response rate (83% rate on effect of element on players, 85% on presence of element in game). Even accounting for the fact that these question sets were unanswerable on some forms due to an error, this only jumps to 90% and 92%. The reason for this is not entirely clear, but may be due to the fact that a not insubstantial number of games (~1/3) did not have a character or actor given for the players to engage with.
- What this indicates is not that emotional engagement with characters is uninteresting or useless – rather that it is likely to be neutral in professional wargames which are not usually highly tied to the characters being played .

Emotional Character Engagement: Coded Responses

- Coded Qualitative Data:
 - Very high non-response rate (~40%)
- Players who gave responses = pretty even split
 - Only a slight number of people who had little or somewhat.
 - Note that the “no” is probably slightly inflated by players who lack the ability to become a character. Also, there may be a bias as some games run had no characters in them.

<i>Were You Engaged?</i>	<i># of Responses</i>	<i>% of Total</i>	<i>% of Given Answers</i>
Yes	42	26%	43%
Somewhat	14	9%	14%
Little	2	1%	2%
No	39	24%	40%
N/A, Unfilled, or Blank	63	39%	—

Emotional Character Engagement: Coded Responses – More Selective

- Let us fix the fact some games have no character
 - Characterize games by their type of briefing (character, role, team, or none)
- Character briefs performing the highest, no briefs performing the lowest.
- This is as expected, the more there is to engage with the character in the brief the more engagement occurs.
- Team briefs are high due to an outlier
 - One of the runs of *Jaws of the Dragon*, with the highest player reported immersion and emotional engagement with character out of any individual game, due to novelty bias from the players.
- There is a statistically significant difference between none and all others, but not in-between different types of character
- May indicate that when a designer gives players a facet of a character to latch onto, they will be able to, as long as you give them a facet!

Type of Briefing	Emotional Engagement w/ Characters	St. Dev.	# of Datapoints
Character	3.16	.92	83
Role	3.01	.98	171
Team	3.35	.91	30
None	2.59	1.06	150

Why Do People Engage with Characters in Wargames

- How much responsibility the player had came up repeatedly
 - Both as a positive when they had high responsibility, or a negative when they had little responsibility

<i>Code/Code Group</i>	<i># of Codes</i>
Actor Responsibility	17
Insufficient Character to Engage With	14
Personal Identification with Character	9
Other Players	7
Metaknowledge	6
Wanting to Win	6
Bad Gameplay	5
Goal Alignment	5
Personal Attachment to Role	5
Wanting to do their Duty	5
Good Briefing	4
Mindset Adoption	4
Roleplaying	4
Played as an Adversary	3
Engagement Increased Over Time	2
Power	2
Was too Focused on Game	2

Why Do People Engage with Characters in Wargames

- Insufficient Character to Engage With mentioned repeatedly, always as a negative
 - This could be because:
 - There was no character to engage with in the game
 - The role did not “click” with the player as it being a person
 - Because there was insufficient information
 - Because the actor was not one that could be highly engaged with by the player.
- Personal identification with the character (either empathization or bleed) occurred in a positive manner in several cases.
 - Identification may occur due to:
 - Players metaknowledge of the game
 - Players having a personal attachment to the actor involved

Why Do People Engage with Characters in Wargames

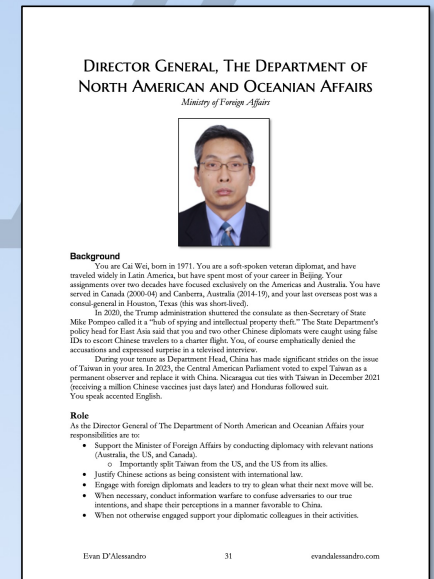
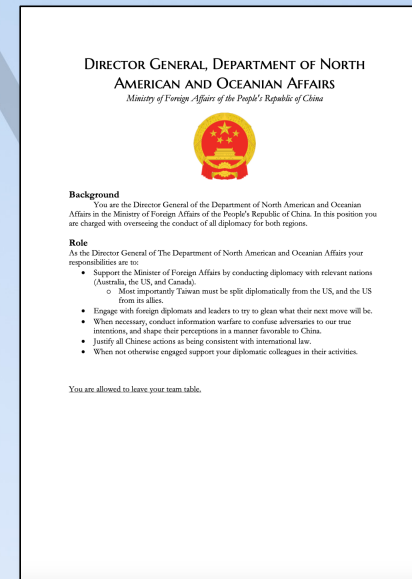
- Roleplaying
 - Some descriptions as:
 - Roleplaying
 - Another set of responses indicated players were actively trying to adopt the mindset of the character (either as a poor man's roleplaying or lacking the vocabulary to call it "roleplaying" is not known).
 - A number of players reported "Wanting to do their Duty."
 - As one player said "I felt a need to try to fulfill my duty. It might've been my particular position, but I really wanted to do my role well." This sort of phraseology is very interesting in that it is a sort of high-bleed expression of goal alignment between the player and character.
 - A number of players reported the briefing as helping them immerse into character.
- Some players engaged because they were playing as Red

Why do People Engage with Characters in Wargames

- Things with less detail:
 - Some noted that they were so focused on playing the game that it reduced their emotional engagement with character.
 - Other players were mentioned as a factor without much detail unfortunately (though this will be examined later).
 - Wanting to win again shows up, closely followed by its cousin of goal alignment, with goal alignment able to be clearly demarcated unlike in the response for Overall Emotional Engagement with the Game
 - Various cases of bad gameplay hampered several players emotional engagement with their character (game too slow, rules too complex, too much downtime).

Emotional Engagement with The Characters: Conclusion

- People engage with characters in very complex ways.
- Player's immersion benefits from emotional engagement with characters
- This is dependent on having some characterization for the player to engage with.
- Requirements for character engagement seem moderate – you need to give them something personal to hold onto!



A role briefing and a character briefing for the same role.

The Level of Challenge

- The level of challenge was one of the most important elements reported by players.
 - Average of 3.67 (SD = .84)
 - No individual run of a game, or average of a game with at least 5 surveys averaged less than 2.8.
- This is fully in line with expectations laid out in flow literature
- However, one problem in evaluating this is that all games were intended to be challenging
 - Thus, the sample is representative of some professional wargames (and commercial wargames writ large), but doesn't apply cleanly to less challenging games, which limits applicability to BOGSATS or seminar wargames.

Rules Challenge

- To attempt to assess challenge in more detail the games can be split up by how challenging they were and the type of challenge
- Games can be evaluated based on the challenge presented by the rules, e.g. how challenging are they to learn and play.

<i>Level of Rules Challenge</i>	<i>Reported Immersion</i>	<i>Player Assessed Contribution to Immersion</i>	<i>Player Assessed Presence in Game</i>	<i># of Datapoints</i>
High	3.36 (SD = .80)	2.88 (SD = .80)	3.04 (SD = 1.09)	80
Medium	3.66 (SD = .83)	3.28 (SD = .83)	3.25 (SD = .98)	169
Low	3.67 (SD = .77)	3.16 (SD = .77)	3.18 (SD = .92)	201

Rules Challenge

- Games with high rules challenge perform the worst, which is roughly to be expected.
- However, medium-low rules do the best
 - Statistically significantly different from High, but not from each other
- In Player Assessed Contribution to Immersion, medium performs best.
- The success of medium here (nearing statistical significance, so one should be cautious) can be explained as hitting a sweet spot of enough rules for players who are immersed by the game mechanics without having too many that players are turned off by them.
- Looking at Player Assessed Contribution to Immersion medium and low perform are almost the same.
 - Probably indicates that while high rules load is a known issue, both medium and low rules are acceptable enough for most players.

Decision Challenge

- The level of decision challenge in the game can be looked at: e.g. how much players had to make complex decisions during gameplay.
- High decision challenge performs the best, followed by Low, with Medium in the middle.
- The differences between High and Medium and Low and Medium are significant, but low to high is not.

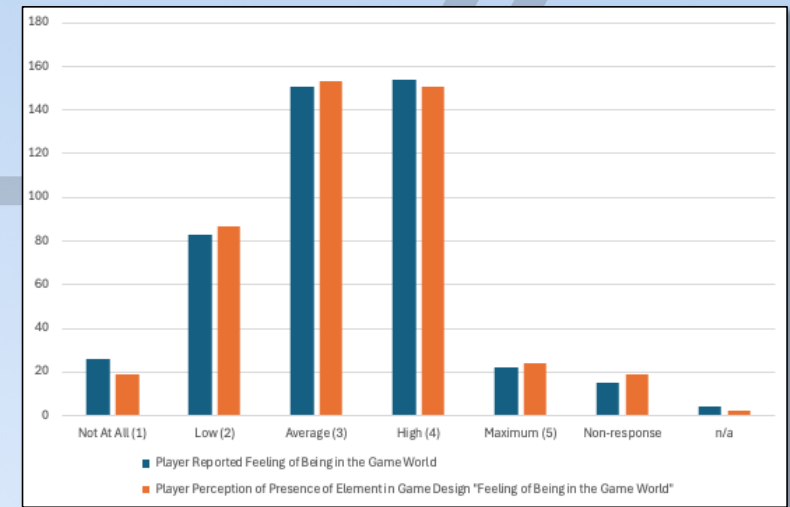
<i>Level of Decision Challenge</i>	<i>Reported Immersion</i>	<i>Player Assessed Contribution to Immersion</i>	<i>Player Assessed Presence in Game</i>	<i># of Datapoints</i>
High	3.83 (SD = .69)	3.78 (SD = .69)	3.77 (SD = .88)	130
Medium	3.49 (SD = .83)	3.63 (SD = .83)	3.61 (SD = 1.01)	277
Low	3.72 (SD = .72)	3.63 (SD = .80)	3.67 (SD = .97)	43

Decision Challenge

- This does not meet expectations
 - Not what engagement would predict
 - Is what flow would predict (but flow is not great for understanding this)
- Possible explanation – Players are either lazy or highly engaged, and that Medium decision challenge strikes the wrong balance.
 - Medium is too relaxed for players who want challenge, while medium also proves too active for a relaxed game experience.
- The answer here is very unclear, and while there may be some sample bias occurring, it does not explain away the performance of the Low choice to such a degree.
- Rather the more reasonable explanation is that due to the small sample size in the Low category (9 games, and only 7 unique games), the high reported immersion for the low category is due to other immersive mechanisms and elements.

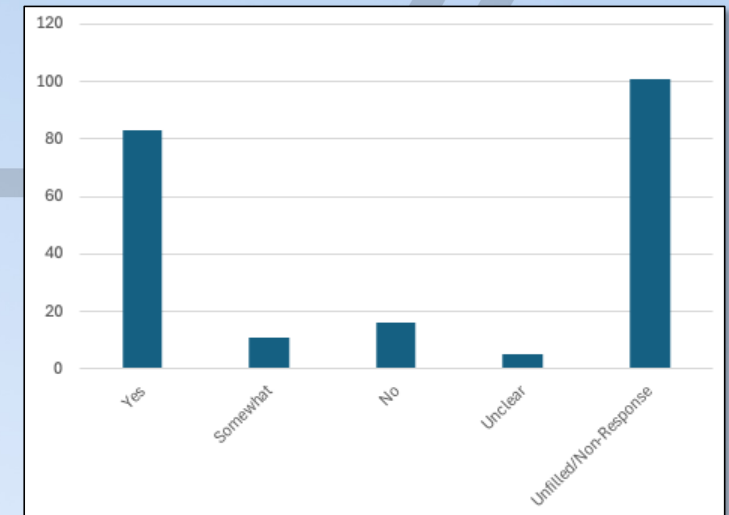
Your Feeling of Being in the Game World

- Slightly over the 3 average at 3.14 (SD = .98), with player reports of its presence being 3.17 (SD = .96).
- Further Investigation?
 - No short response questions related directly to presence
 - Attempts to use another question was not successful
- Unfortunately, this leaves us with little further ability to evaluate this element.



The Narrative

- Narrative was rated highly at 3.56 (SD = .91).
- Short Answer question “Were you engaged by this narrative? Why or why not?” When coded on whether or not players were engaged by the narrative this produced the following distribution:
- Large number of “yes” results in comparisons or the Somewhat and No responses seems to agree with the high assessment of narrative.



Why are Players Immersed by Narrative?

- Coded reasons for being immersed by narrative:
- The realism or unrealism of the narrative is the dominant factor mentioned (~18% of all surveys with the question mentioned this!).
- Note “realism” is player perception of realism, not that the narrative was inherently realistic.
 - A lack of realism was not always lethal to a game (games must be internally coherent, see Sci-Fi and Fantasy)

Code	Count
Realistic	19
Not Realistic	10
Real World Relevance	6
Forced to Focus	4
Consequences to Actions	4
Narrative Clarity	4
Personal Stake	3
Narrative Quality	3
Player was Central to the Game	2
Gameplay Understanding	2

Engaged by Narrative?	Narrative Realistic	Narrative Not Realistic
Yes	18	3
Somewhat	1	3
No	0	4

Why are Players Immersed by Narrative?

- Engaged by the narrative because the topic of the game had relevance to the real world
 - “Yes [the narrative was engaging] because it is obvious how much this can tell us about a potential crisis.”
 - Similarly, people reporting being engaged because they had a personal stake in the game either due to personal interest/relevance.
- Engaged by the narrative because the game moved at pace and demanded their attention and focus
 - “Yes [the narrative was engaging], because it immediately launched the players into a crisis which engaged our attention”
- Players were engaged because there were consequences to their actions in two ways:
 - 1) It produced a high-stakes game for them
 - “Yes/ It feels like there is a lot at stake,”
 - 2) Players felt that their actions could shape the narrative
 - “Yes it felt like almost anything could happen, but that our actions had real impact.”
- This theme of player ability to influence the narrative was also described by two different players whose central role in the game helped them to be engaged with the narrative, presumably by the same two mechanisms.

Why are Players Immersed by Narrative?

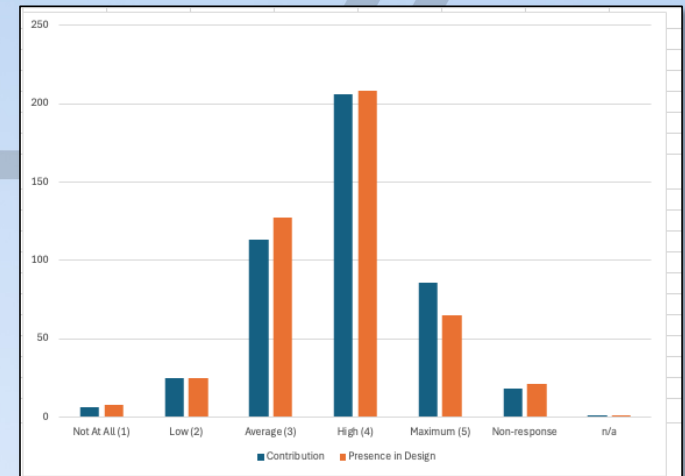
- Clarity of the Narrative
 - Positive when it was:
 - Easy to understand
 - Explained well
 - Well presented
 - Suffering when the narrative was unclear.
 - Either because the narrative is muddled
 - Or if playing the game is difficult or unclear it makes the narrative unclear
- Quality of the Narrative
 - Well-developed and good narrative = positive
 - No narrative progression = negative.

Narrative Conclusions

- Little new information here beyond Perla and McGrady, but now some evidence on how important and how it works in wargames
- Narrative seems to be important (both in quantitative and in qualitative data).
- The major factor for this appears to be the players perception of how “realistic” the unfolding narrative of the game is.
- Additional impactful factors are likely the players personal engagement with the narrative (by preexisting interest/ties or by the need to make consequential decisions), and the quality of the narrative and the narrative's presentation being critical.
 - Does not mean players need to know everything, it just needs to be clear to them that there is fog of war or there are parts of what is going on that they don't know.

Your Focus/Attention on the Game

- Focus and attention on the game are rated as most contributory element to immersion 3.78 (Std. Dev. = .87)!
- This likely only indicates that players were highly focused, and as such, rated the game design as having a high degree of attempt to focus them on the game.
- It is hard to say anything about this symptom because almost no games intentionally or unintentionally tried to avoid focus/attention on the game.



Your Focus/Attention on the Game

- If we split the game up by how many potential distractors there were, we get the following:

<i>Focused Attention?</i>	<i>Avg. Reported Immersion</i>	<i>Count</i>	<i>Games</i>
Low/No Distractors	3.83	413	Numerous
Some Distractions	3.46	27	Dungeon Deck Crawl, FAS! Wargame, Strike from Space (CoW '25)
Distractions	3	15	Magnificent Desolation, 1 Hour Hex 'n Counter

- This shows numbers that would be expected, but the datapoints for Distractions and Some Distractions are too low to be of use and they have too few types of game.
- Conclusion: in a well-designed game, players view it as highly contributory to their immersion, but it cannot be easily determined how much the inverse is true.
 - Design a good game so you don't find out the inverse!

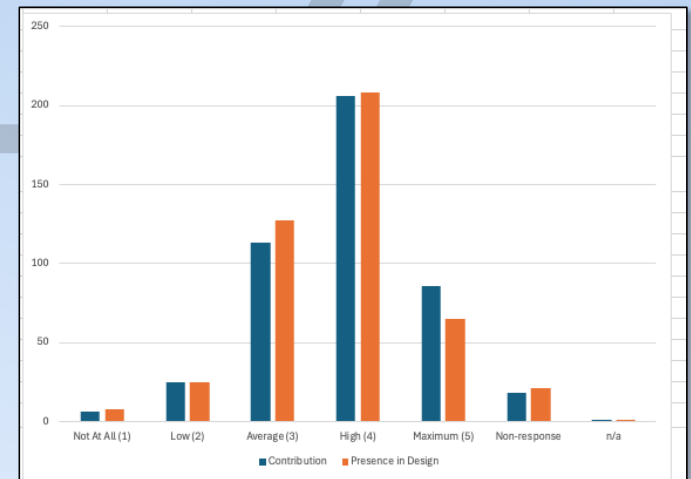
Outside Knowledge About Parts of the Game (Topic, Mechanics, Other Players)

- Outside knowledge on players was rated quite highly at 3.47 (SD = .96),
- Can divide up further based on what people said their level of knowledge was
- See maybe a higher level of immersion from more outside knowledge, but difficult to tell.

<i>Level of knowledge about game topic before the game</i>	<i>Average Immersion</i>	<i>Std. Dev.</i>	<i># of Surveys</i>
Extremely	3.75	0.50	4
Very	3.84	0.68	44
Moderately	3.59	0.76	74
Slightly	3.49	0.78	51
Not at all	3.55	0.67	22

What is Wrong?

- Players rate it highly, but...
- Correlation coefficient shows no real interrelation of knowledge to immersion, most likely explanation is players overestimated their knowledge.
- Using post-game knowledge (with the confounder of players having learned), we get a very weak correlation
- Large numbers of players self selected for games
 - If players like a topic, they are more likely to have knowledge of it - means we are thinking causation is occurring when in reality it is a correlation between immersion, enjoyment of topic, and knowledge of the topic is occurring?
 - As Arnaudo discusses – it is not player knowledge of the topic that is massively contributing to their potential enjoyment but if they like the topic.



Why does Outside Knowledge Improve Immersion?

- The linkage between having outside knowledge of the game and increased enjoyment was already predicted by Wake
- Outside knowledge affected player action in some way.
 - This is not unfamiliar to professional wargamers = why we have facilitators and SME's
 - Exact mechanisms are not fully clear. Possibilities:
 - Players' knowledge of their actor led to different decision-making
 - Players' knowledge of how things work in the real world affecting their decisions.
- Several players reported that their outside knowledge made the game easier to play (removing barriers).
 - "Yes, I am a US Navy officer. It helped me enjoy the game more because I understood what was possible without guessing or assuming."
 - Low knowledge can make the game harder to play,
 - Often linked to an increase in enjoyment of the game
 - "Yes. My training as an air battle manager gave me the knowledge and training on how to employ my aircraft and launch air campaigns. It made the game more enjoyable as I could effectively employ my air assets."

Code	Count
Increased Enjoyment	10
Affected Player Action	8
Made Game Easier to Play	5
Helpful*	3
Increased Roleplaying	3
No Effect	3
Increased Immersion	2

Why does Outside Knowledge Improve Immersion?

- Outside knowledge is not a uniform good – Fight the White
 - Players do not like simplification or abstraction in their technical areas
 - “I do research on Chinese nuclear weapons and by extension, their military forces. Seeing how combat was simplified created a system incongruence in my head. But I’m nitpicking too much.”
- Being able to apply knowledge is not a given
 - “Yes [I have outside knowledge]. Does not help. Game is more board game than effected by elements I am familiar with.”
- Outside knowledge helps roleplay
 - “I wrote an essay on ROK-DPRK negotiations post 1990 + did a DPRK history module. Helped me portray my role more realistically.”
 - “Yes, it allowed me to act with more confidence when it came to playing certain characters.”
 - “I had already researched my character a week earlier, which made me feel comfortable.”

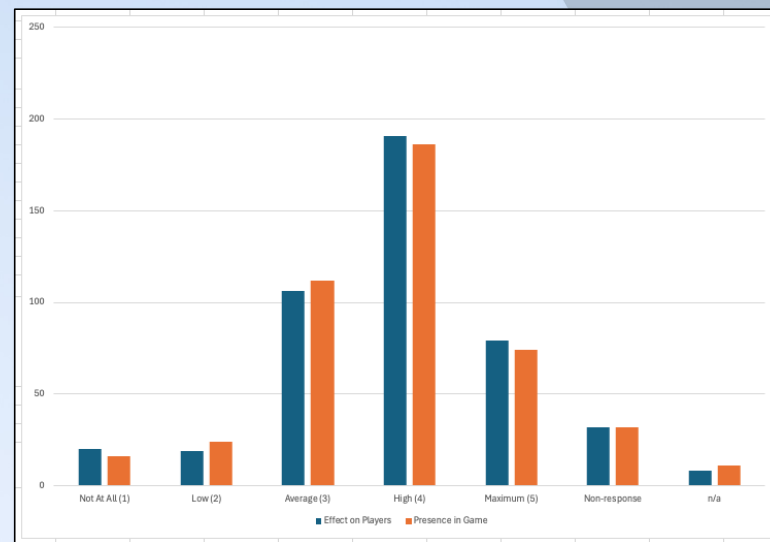
Code	Count
Increased Enjoyment	10
Affected Player Action	8
Made Game Easier to Play	5
Helpful*	3
Increased Roleplaying	3
No Effect	3
Increased Immersion	2

Outside Knowledge Conclusion

- Overall, it appears that outside knowledge is probably an effector on the players (how much is hard to tell)
 - Players report high levels, but a statistical comparison comes much lower, though the statistical approach has issues.
 - Could be because players are predisposed to overreport the effect if they know something/like the topic.
- It operates by several mechanisms (which may reinforce other mechanism of immersion)

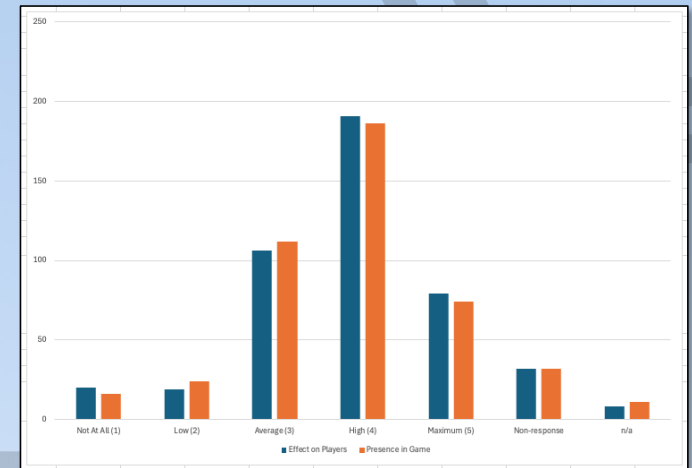
Other Players

- The effect of other players on immersion is quite high = 3.7 (Std. Dev. = .99).
- The distributions of answers here however are interesting:

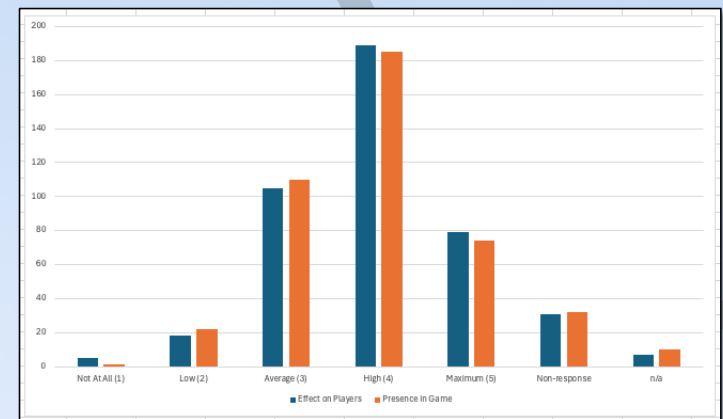


Other Players: Distributions

- A very small number of responses in the *Not at All* and *Low* category
- Seems to indicate that players almost always have their immersion improved by other players (who they cannot help but to interact with in the course of most games).
- If looking at solo wargames only they have a score of 1.47 for other players, a substantial drop, indicating that wargames that have player interaction can't help but cause immersion.
- Removing the solo wargame's surveyed from the dataset almost removes the “not at all” columns.



Distribution of All Data



Distribution of All Non-Solo Games

Other Players: The Size of the Game

- Does the number of players the person could interact with affect their immersion?
- Split games on sizes:
 - Solo (1 player)
 - Small (2-10 players)
 - Medium (11-30 players)
 - Large (31+ players).
 - Note a potential source of biasing is that even in a large game you tend to interact with a core group of people – does not seem to pan out in data
 - Bias due to megagames?

	Game Types			
	Solo (1 p)	Small (2-10 p)	Medium (11-30 p)	Large (31+ p)
Average	1.47	3.73	3.71	3.91
Std. Dev.	1.02	0.91	0.90	0.78
Response Count	20	130	100	165
	Responses as % of Size Group Responses			
Not At All (1)	71%	3%	1%	0%
Low (2)	5%	3%	7%	4%
Average (3)	5%	26%	30%	20%
High (4)	10%	40%	39%	47%
Maximum (5)	0%	16%	18%	20%
Non-Response	5%	10%	5%	7%
n/a	5%	3%	1%	1%

Other Players: The Size of the Game

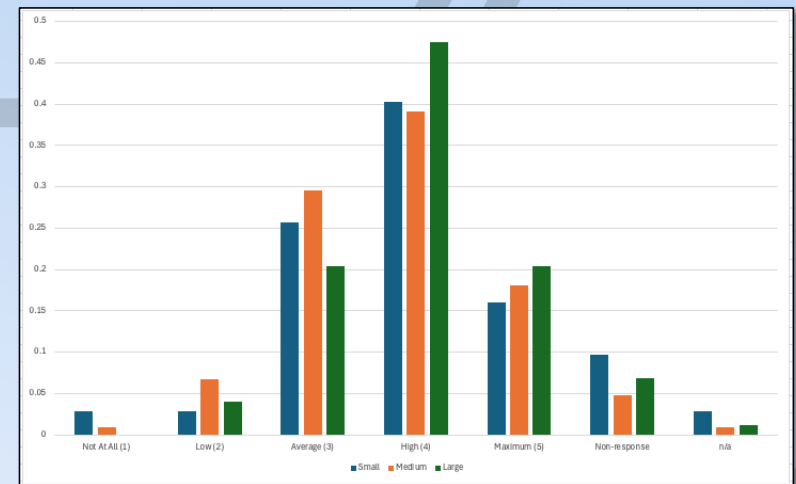
- This seems to indicate some level of effect from having a very large game, but this is tentative at best
- Solo obviously performs poorly.
- There seems to be a raw effect from playing games with other players, no matter the number.

	Solo (1 p)	Small (2-10 p)	Medium (11-30 p)
Small (2-10 p)	Significant beyond .001		
Medium (11-30 p)	Significant beyond .001	Not Significant	
Large (31+ p)	Significant beyond .001	Not Significant*	Not Significant*

* These values are significant to the .1 level if Solo games (N=19) are removed from the analysis, and the ANOVA remains statistically significant.

Other Players: The Size of the Game

- This is interesting in that the small and medium values pretty closely match each other.
- Large games overperformance is because a chunk of the “average” responses move to “high” responses compared to small and medium games.
- Megagames make up the entirety of the “large” category and a large part of the “medium” category.
 - Such games tend to be designed around player interaction so theoretically should overperform + Megagames are very immersive in the data, so should overperform
 - However, if this effect was extreme, one would expect to see medium games outperform small games more which they do not = means something about the size is probably effectual?
- Could be “high” games all tend to be quite long in nature and thusly more immersive, or are more “grand” in scale and thus immersive?
 - No clear answer.
- Conclusion: Player interaction is perceived by players as being very important immersion in non-solo wargames
 - This seems independent of the type of game: all games can benefit strongly from a good player base.



Conclusion

Element	Avg.*	Real Avg.	St. Dev.	Notes on Data Sample Effect	Effect of Notes on Average	Theoretical Effect Type† (Synergistic or Additive)
Your focus/attention on the game	3.78	↓	0.87	Average may be high due to lack of non-engaging games surveyed.	Data Sample effect means Average is likely lower in reality.	X
Other players	3.70	↑	0.99	Average is decreased due to presence of solo games.	Data Sample effect means Average is likely higher in reality.	+ and X
The level of challenge	3.67	↓	0.84	Average may be high due to lack of non-challenging games surveyed.	Data Sample effect means Average is likely lower in reality.	X
The Narrative	3.56	—	0.91	—	—	X
Outside knowledge about parts of the game	3.47	↓?	0.96	—	Statistical data shows lower effect than players reported.	+
Emotional engagement overall with the game	3.22	—	0.89	—	—	X
Your feeling of being in the game world	3.14	—	0.98	—	—	X
Game pieces/Graphics/ Text/ Briefings	3.12	—	0.92	—	—	+
Emotional engagement with the characters	2.93	—	1.01	—	—	X
Space where the game is played	2.69	↑	1.02	Possibly lower as no 360° aesthetic games surveyed.	Data Sample effect means Average is probably somewhat higher in reality.	+
Sound	1.59	↑↑	0.93	Lack of “sound” games in the dataset, dataset is not useful to estimate the effect of sound	Data Sample bias, ignore the average.	?

* Average of player perceived effect on their immersion.

†Theoretical Effect Type is assessed in the next section.

Basic Things you Can Do to Increase Immersion (Some Suggested Best Practices)

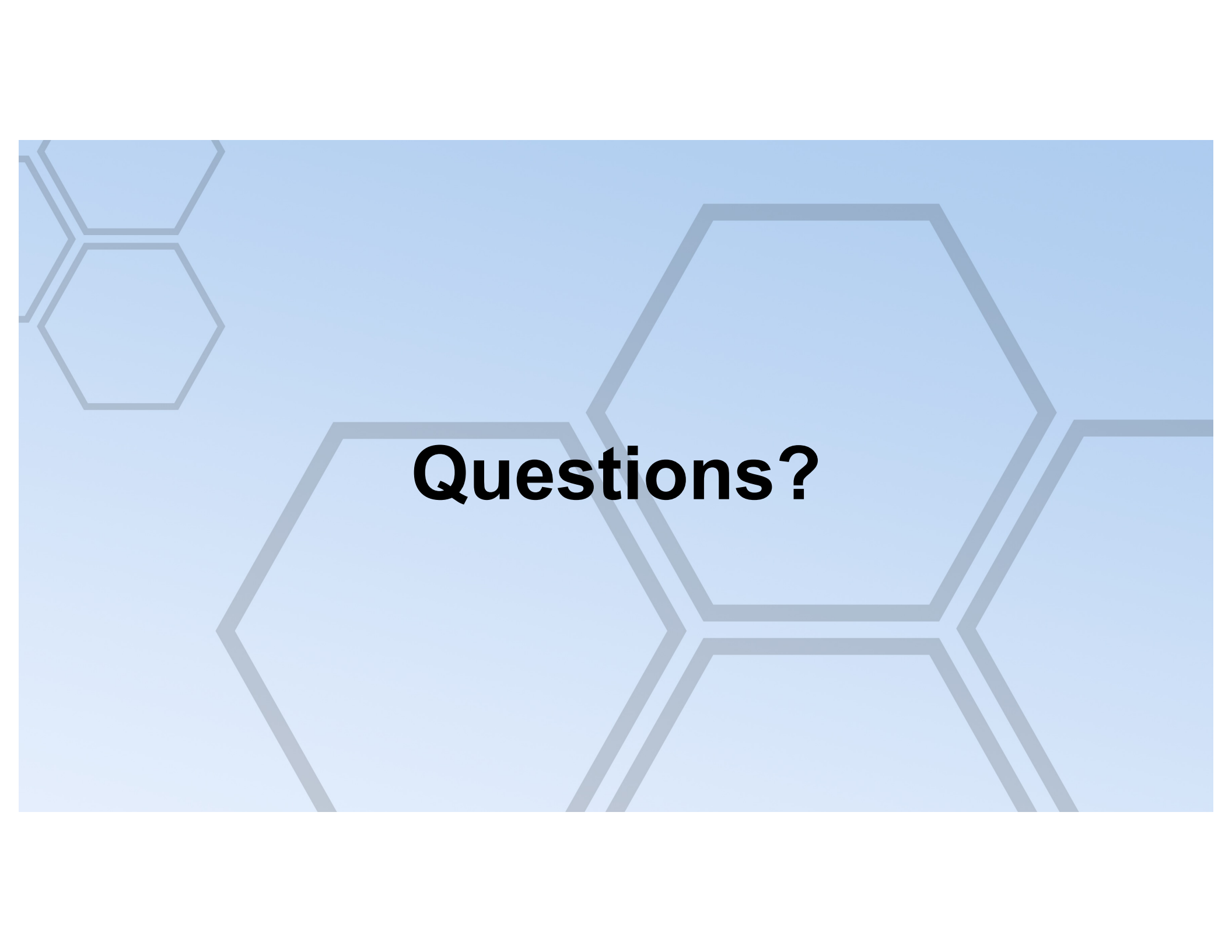
- You already know what you are doing
- These are very contextually specific to the game/players/institutional culture!

Basic Things you Can Do to Increase Immersion (Some Suggested Best Practices)

- Sound (Music, Sound, Ambiance, etc.)
 - Unclear
- Game Pieces, Graphics, Text, and Briefings
 - Graphics make the game easier to play
 - Graphics match the theme of the game
 - Good enough graphics – do not have bad graphics
- Space Where the Game is Played
 - Set up the tables/rooms to create separation/closeness
 - Try to use rooms that are close to what they would be in in the game world
 - Nametags + Flags + other basic space things
 - Central locus of the game (map, room, briefing time, etc.)
- Overall Emotional Engagements
 - Try to create collaborative teams
 - Give players power/show relevance (consequences) of decisions to the game
 - Uncertainty (for some players?)
- Characters
 - Give the players stuff to latch onto for their character
 - Create permission structure for roleplaying (risks as per last year's discussion)
 - Give players authority
 - Give players characters they can personally engage with (personal attachment or know something about)

Basic Things you Can Do to Increase Immersion (Some Suggested Best Practices)

- The Level of Challenge
 - Avoid massive rules crunch
 - Usual stuff on making the game appropriately challenging for the players
- Your Feeling of Being in the Game World
 - Not known at this time
- The Narrative
 - Make sure the narrative is “realistic” (player perception of “realistic” ≠ real)
 - Make sure the narrative is clearly communicated to players
 - Pace of gameplay captures player attention/focus
 - The game topic is relevant or personal to the players
- Your focus/attention on the game
 - Prevent distractions
- Outside knowledge about parts of the game (topic, mechanics, other players)
 - Get players in who know things (Mechanics + Topic (can also be a fight the white risk))
 - Brief players so they know more?
- Other Players
 - Have them!
 - Get players who will get on well with other people!



Questions?

Some good introductions to immersion that I do not wholly agree with, but a good start regardless (Part 1)

- On my Own PhD Work:
 - D'Alessandro, Evan. 'Is Immersion the Basis of Effective Wargaming?' Connections 2023, Washington DC, USA, National Defence University, 23 June 2023. https://docs.google.com/presentation/d/17KWNQGYt1UrWfx7OCBKNI2YtHCW_aNCL/edit#slide=id.p1.
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Some good introductions to immersion that I do not wholly agree with, but a good start regardless (Part 2)

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- Farkas, Timea, Alena Denisova, Sarah Wiseman, and Rebecca Fiebrink. 'The Effects of a Soundtrack on Board Game Player Experience'. In Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems. New Orleans, LA, USA: ACM, 2022. <https://doi.org/10.1145/3491102.3502110>.
- Farkas, Timea, Sarah Wiseman, Paul Cairns, and Rebecca Fiebrink. 'A Grounded Analysis of Player-Described Board Game Immersion'. In Proceedings of the Annual Symposium on Computer-Human Interaction in Play, 11. Virtual Event, Canada: ACM, 2020. <https://doi.org/10.1145/3410404.3414224>.
- Magelssen, Scott. 'Rehearsing the "Warrior Ethos": "Theatre Immersion" and the Simulation of Theatres of War'. The Drama Review 53, no. 1 (1 March 2009). <https://doi.org/10.1162/dram.2009.53.1.47>.
- Salen, Katie, and Eric Zimmerman. Rules of Play - Game Design Fundamentals. Massachusetts London, England: MIT Press Cambridge, 2004.