

The Impact of White Space on User Experience for Tablet Editions of Magazines

FANYI CHENG

School of Media Sciences , Rochester Institute of Technology

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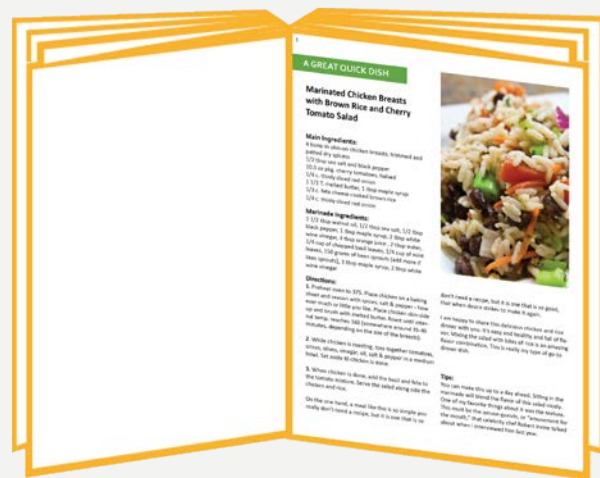


OUTLINE

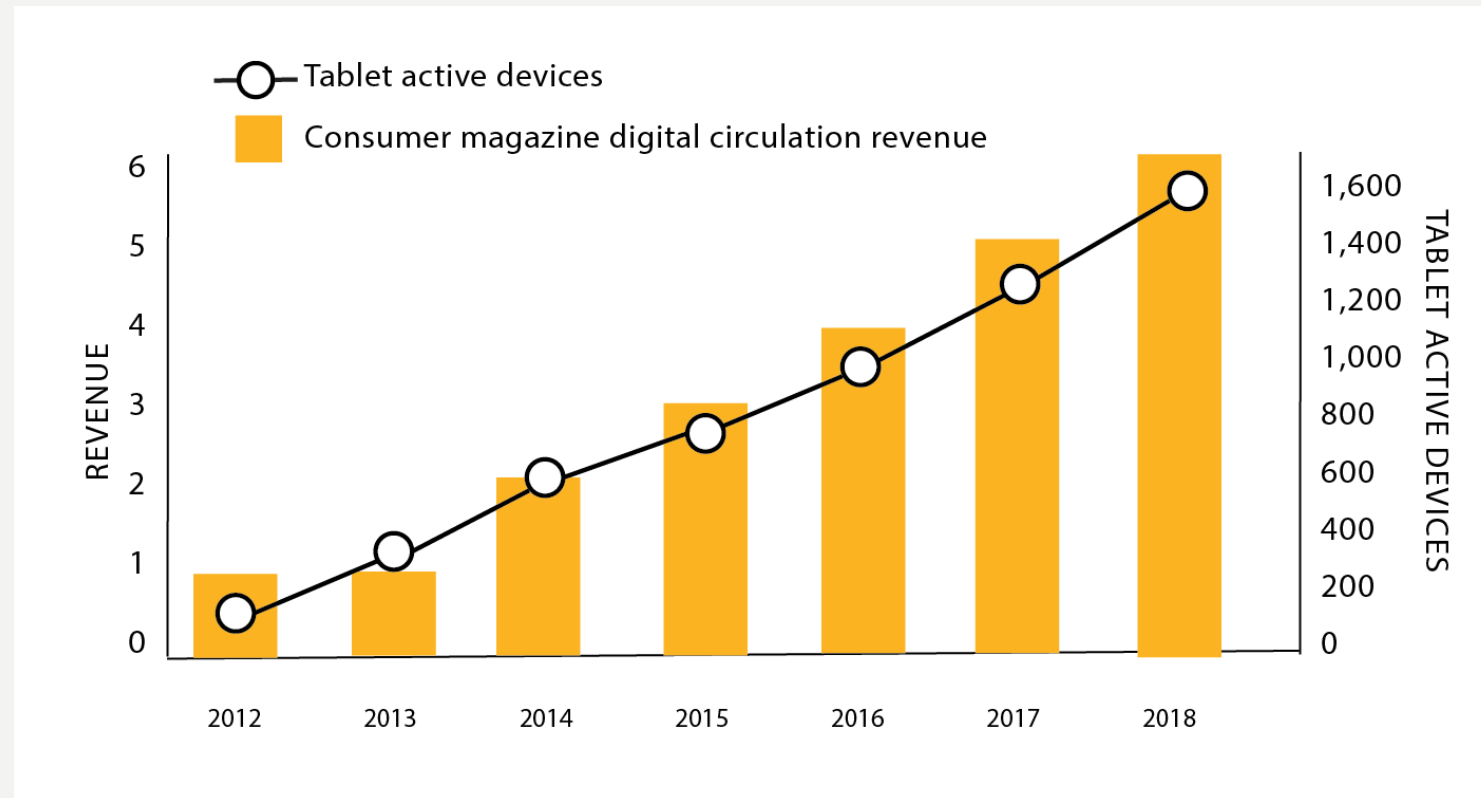
- Introduction
- Topic Statement
- Theoretical basis
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- Research Goals
- Research Questions
- Methodology
- Analysis of Data
- Findings
- Conclusion
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INTRODUCTION

After declining for six years (Wang, 2016), printed magazines are facing the dilemma of a “paperless” era.



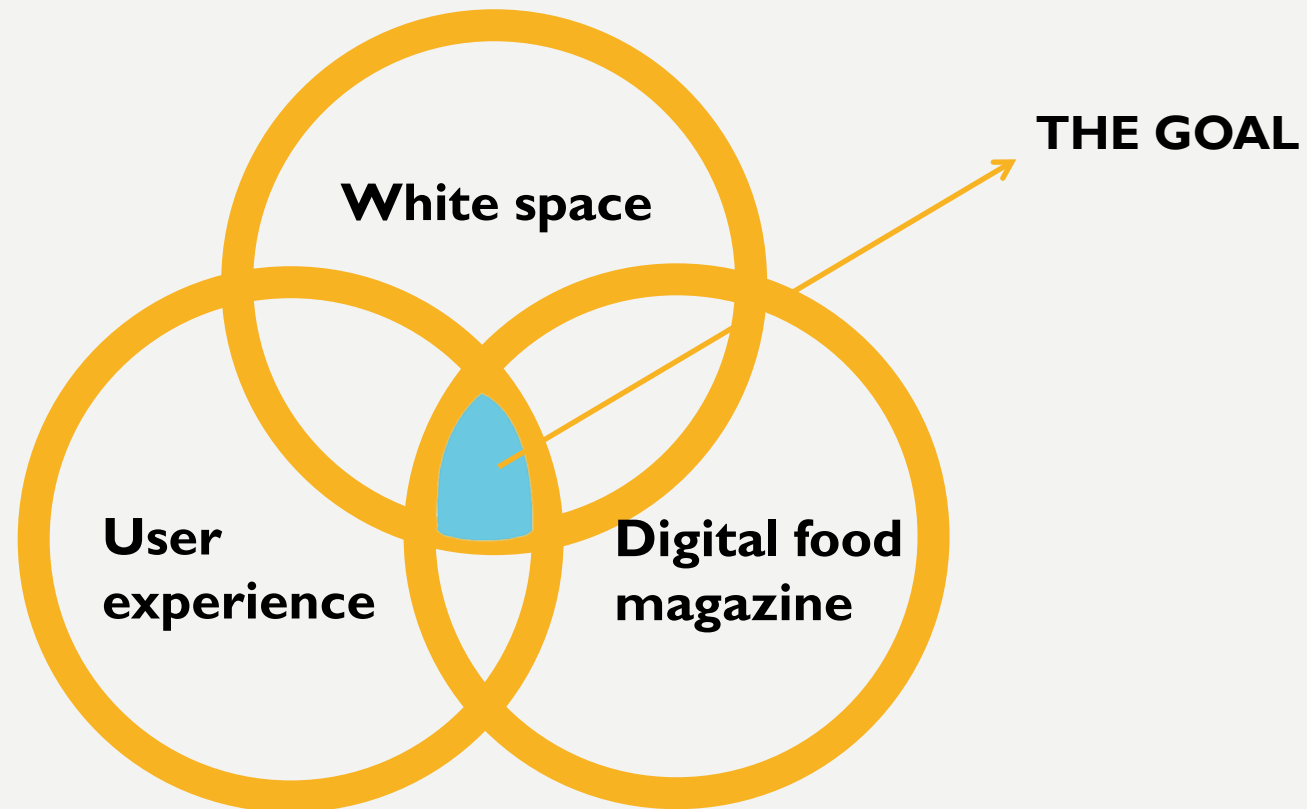
- Tablet ownership will be a major driver of digital magazine revenues (2014)



Global entertainment and media outlook, PWC, 2014

TOPIC STATEMENT

- Limited studies have looked into white space of digital magazines and people's preference.
- Food magazine is one of the fastest growing genre for digital magazine publishing.



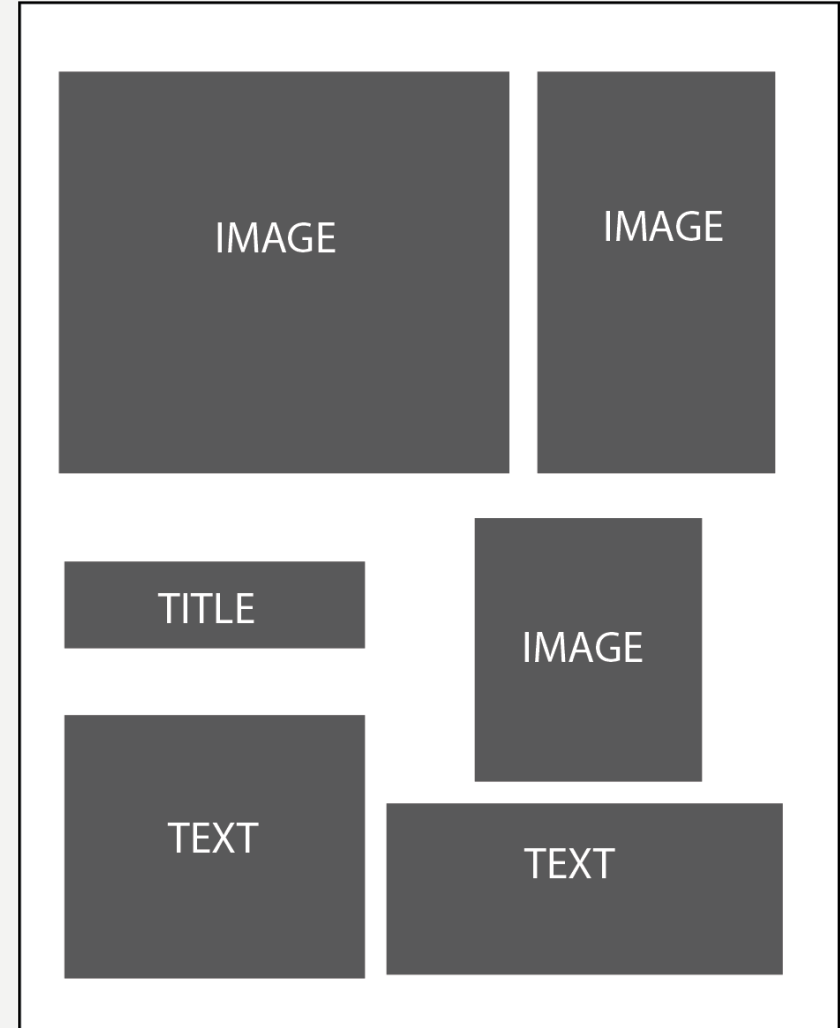
THEORETICAL BASIS

- ◆ White Space
- ◆ User Experience

WHITE SPACE

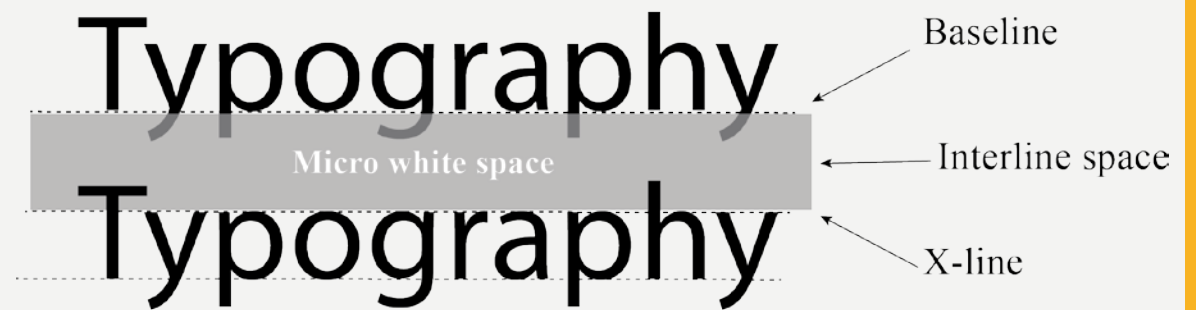
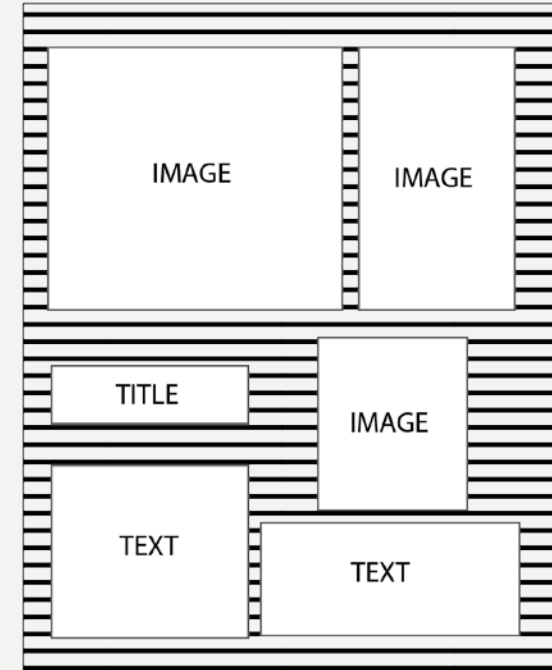
To assess the white space for the purpose of this research, the well-known “figure-ground” relationship is adopted.

All the framed content represented by the blackened rectangle figures is considered as the figure, and the space between the rectangle figures is the ground.



MACRO & MICRO

- The white space is separated into macro and micro
- The shadow area is the macro white space. Macro white space is the space between major elements in a composition
- The micro white space is the interline space, which is the space from the baseline to the x-line of the line below

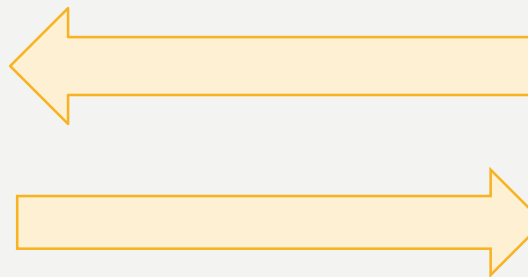


USER EXPERIENCE

- User experience (UX) is defined as “a person’s perceptions and responses resulting from the use and/or anticipated use of a product, system or service” (ISO/FDIS 9241-21)



Visual Aesthetics,
Readability and Legibility



Interaction with digital
magazines on the iPad



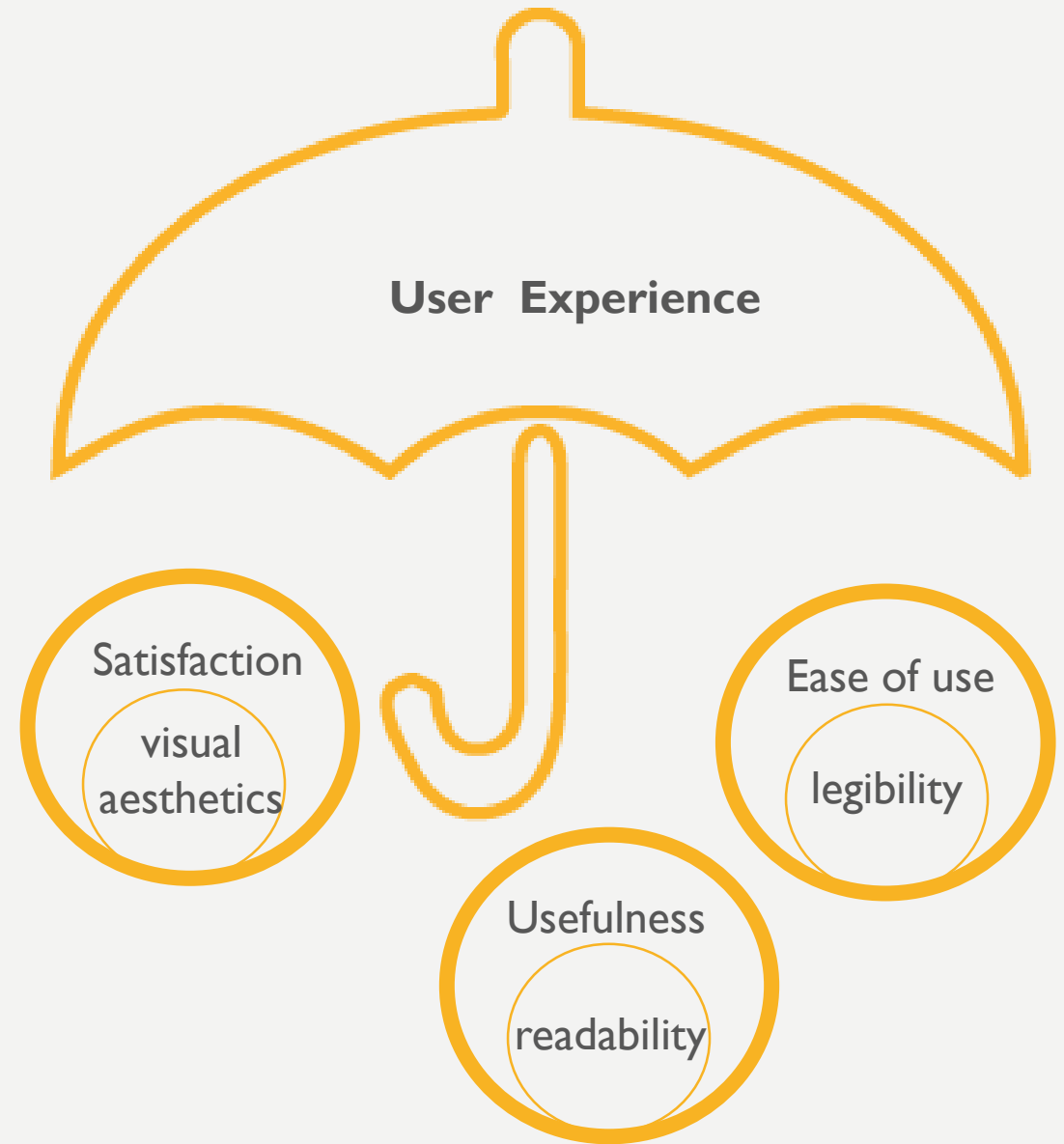
LITERATURE REVIEW

The influence of white space on:

- Perceived aesthetics and usability
- Legibility
- Perception

Dimensions of user experience:

- Satisfaction (visual aesthetics)
- Usefulness (readability)
- Ease of use (legibility)



RESEARCH GOALS

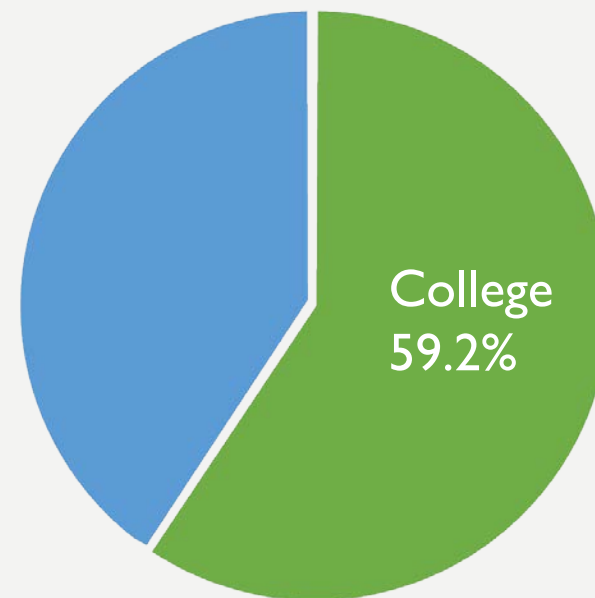
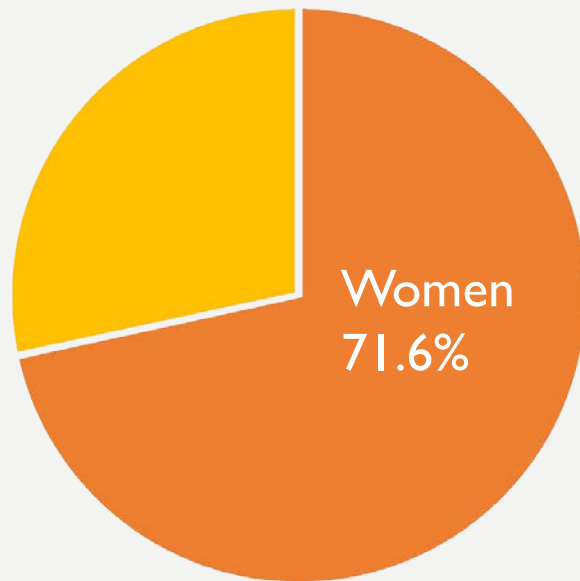
- The study focused on user's reactions and responses while reading magazines with varying levels of white space.
- Three aspects of user experience: Visual aesthetics, Readability and Legibility
 - Visual aesthetics: The degree of how harmonious or beautiful the design appears to a person.
 - Readability: the degree to which a body of text is easy for people to read and understand.
 - Legibility: the ease of how characters and words can be distinguished by eyes.

RESEARCH QUESTIONS

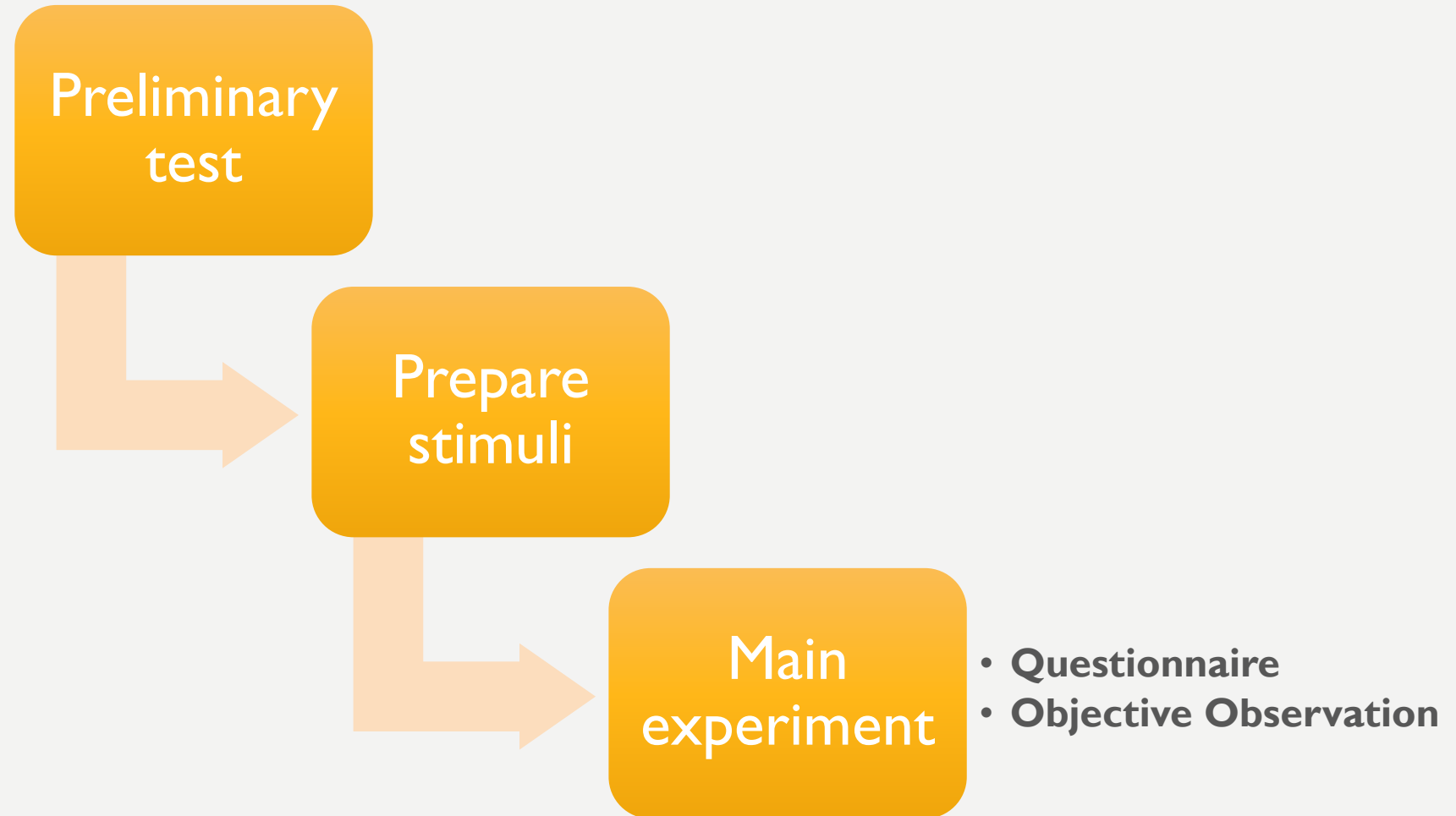
- For articles in the digital editions of food magazines on an iPad platform, does white space impact the User Experience (visual aesthetics, readability and legibility) for readers?
- If so, which dimensions of User Experience have been affected acutely by white space?
- Are there any exact quantitative features in terms of white space attributes that can help designers understand design patterns for digital magazines concretely and explicitly?

PARTICIPANTS

- 62 female students between 18 to 28 years old in RIT
- According to *Food Network Magazine Media Kit* female readers in the Food Network audience amount to 71.6 %, 59.2% of the readers are in college.



METHODOLOGY



MAIN EXPERIMENT

◆ The First Part (perceived self-report)

QUESTIONNAIRE

- Seven-point anchored scale to rate each page.
- Three questions for each page:
 1. How satisfied are you with the visual aesthetics of this page?
 2. How legible do you find this page?
 3. How readable do you find this page?

◆ The Second Part (objective observation)



➤ Legibility

Letter counting was adopted.

Number of letters participant counted and the completion time were documented.

○ *Two measures for Legibility*

1. Average time, the participant used/ Total number of all letters

2. Number of letters participant counted/Actual number of the specified letters

➤ Readability

Memorizing the name of ingredients

Number of ingredients they memorized was documented

○ *One measure for Readability*

The number of ingredients they remembered/ The total number of ingredients

ANALYSIS OF DATA

Questionnaire

- The two-way repeated measures Analysis of Variance (ANOVA)
- Main effects: macro, micro white space, and the interaction effect between macro and micro white space variables.
- Within-subject design
- The participants were considered as Random Effect.
- F ratio is the statistical use to test null hypothesis. $p=0.05$ was used as a cutoff value to designate statistical significance.
- Least square means are the estimated group means using the analysis procedure.

FINDINGS

Visual Aesthetics ➤ Questionnaire

Fixed Effect Tests for Visual Aesthetics

Source	F Ratio	Prob > F
Macro	3.14	0.0141
Micro	11.90	<.0001
Macro*Micro	3.13	0.0017

The highest score

The lowest score

A GREAT QUICK DISH

Marinated Chicken Breasts with Brown Rice and Cherry

Main Ingredients:
 4 bone-in skin-on chicken breasts, trimmed and patted dry with paper
 1/2 Tbsp. melted butter
 10.5 oz. pkg. cherry tomatoes, halved
 1/4 cup of thinly sliced red onions
 3 Tbsp. sliced balsamic olives

Marinade Ingredients:
 1 or 1/2 Tbsp. walnut oil, 1/2 Tbsp. sea salt,
 1/2 Tbsp. black pepper, 1 Tbsp. maple syrup, 2
 Tbsp. white wine vinegar, 3 Tbsp. orange juice,
 2 Tbsp. garlic, 1/4 cup of chopped basil leaves,
 1/4 cup of mint leaves, 1/2 cup of bean
 sprouts, 1/4 cup of chopped rosemary.

Directions:
 1. Preheat oven to 375 degrees. Place chicken on a baking sheet and season with spices, salt & pepper - how ever much or little you like. Place chicken skin-side up and brush with melted butter. Roast until internal temp reaches 160 degrees.
 2. While chicken is roasting, toss together tomatoes, onions, olives, vinegar, oil, salt & pepper in a medium bowl. Set aside till chicken is done.
 3. When chicken is done, add the basil, mint, rosemary and toss these to the tomato mixture. Serve the salad alongside the chicken and rice.

Tip:
 On one hand, a meal like this is so simple you really don't need a recipe, but it is one that is so good, that when I do it I like to make it again, I would describe this exactly did make that? That's definitely happened to me more than once. I am happy to share this delicious chicken and brown rice dinner with you.

Tip:
 You can make this up to a day ahead, letting it in the marinade will lend the flavor of this salad nicely. One of my favorite things about it is the texture. This must be the olive garden, or "amusement for the mouth" that celebrity chef Robert Irvine talked about when I interviewed him last year.



A QUICK DISH


Marinated Chicken Breasts with Brown Rice

Main Ingredients:
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 3. When chicken is done, add the basil and let to the tomato mixture. Serve the salad side the chicken and rice.
 On the one hand, a meal like this is so simple you really don't need a recipe.

Tip:
 But it is one that is so good, that when I do it I like to make it again, I would describe this exactly did make that? A meal like this is so simple you really don't need a recipe. I am happy to share this delicious chicken and rice dinner with you. It's easy and healthy.

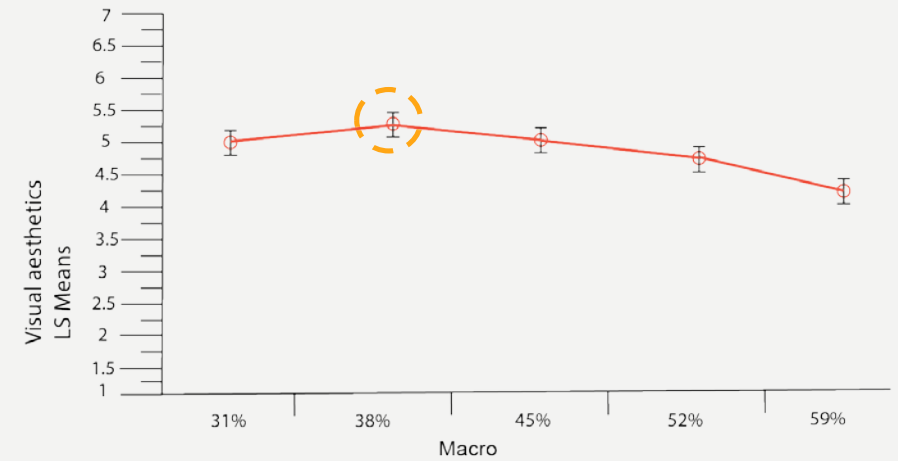


38% macro | 135% micro

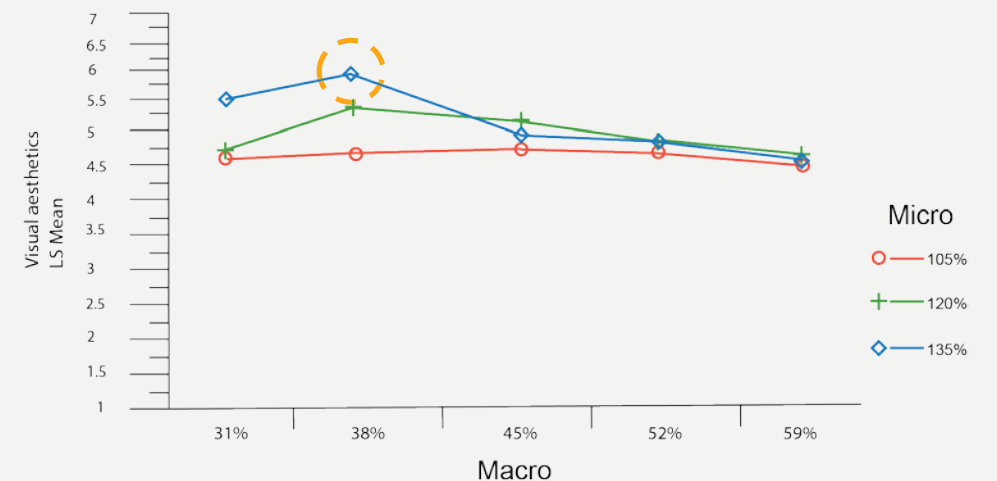
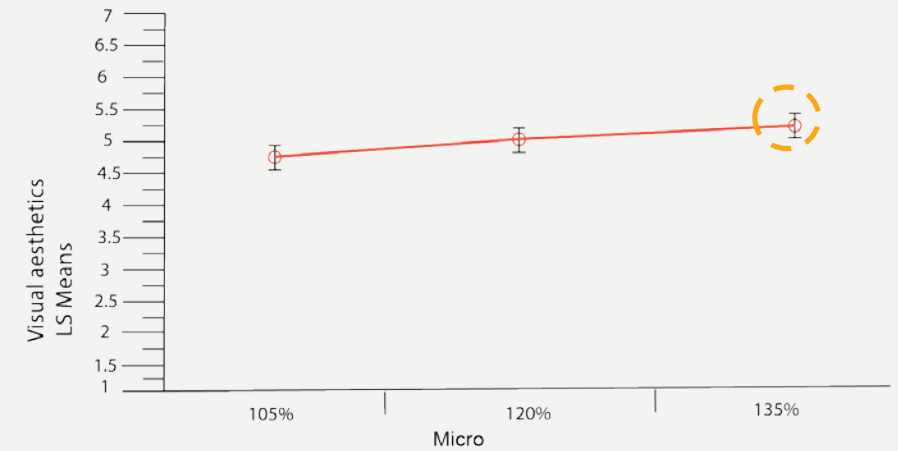
59% macro | 105% micro

The interaction of Macro and Micro

Macro



Micro



• **Legibility** ➤ Questionnaire

Fixed Effect Tests for Legibility

Source	F Ratio	Prob > F
Macro	4.76	0.0008
Micro	28.76	<.0001
Macro*Micro	3.08	0.0020

The highest score

The lowest score

A GREAT QUICK DISH


Marinated Chicken Breasts with Brown Rice and Cherry Tomato Salad

Main Ingredients:
 4 bone-in skin-on chicken breasts, trimmed and patted dry with paper
 1 1/2 Tbsp. melted butter
 1/2 cup cherry tomatoes, halved
 1/4 cup of thinly sliced red onions
 3 Tbsp. silvered kalamata olives

Marinade Ingredients:
 1 or 1/2 Tbsp. white oil, 1/2 Tbsp sea salt, 1/2 Tbsp black pepper, 1 Tbsp maple syrup, 2 Tbsp white wine vinegar, 3 Tbsp orange juice, 2 Tbsp water, 1/4 cup of chopped basil leaves, 1/4 cup of olive leaves, 150 grams of brown sugar, 1/4 cup of chopped rosemary, 1/4 cup of chopped oregano.

Directions:
 1. Preheat oven to 375 degrees. Place chicken on a baking sheet and season with spices, salt & pepper - Use ever much as little you like. Place chicken skin side up and brush with melted butter. Roast until internal temp reaches 160 degrees.
 2. While chicken is roasting, toss together tomatoes, onions, olives, vinegar, oil, salt & pepper in a medium bowl, set aside till chicken is done.
 3. When chicken is done, add the basil, mint, rosemary and feta cheese to the tomato mixture. Serve the salad alongside the chicken and rice.

Tip:
 You can make this up to a day ahead. Sitting in the marinade will blend the flavor of this salad nicely. One of my favorite things about it is the texture. This must be the same genetics, or "amusement for the mouths".



38% macro 135% micro

A GREAT QUICK DISH


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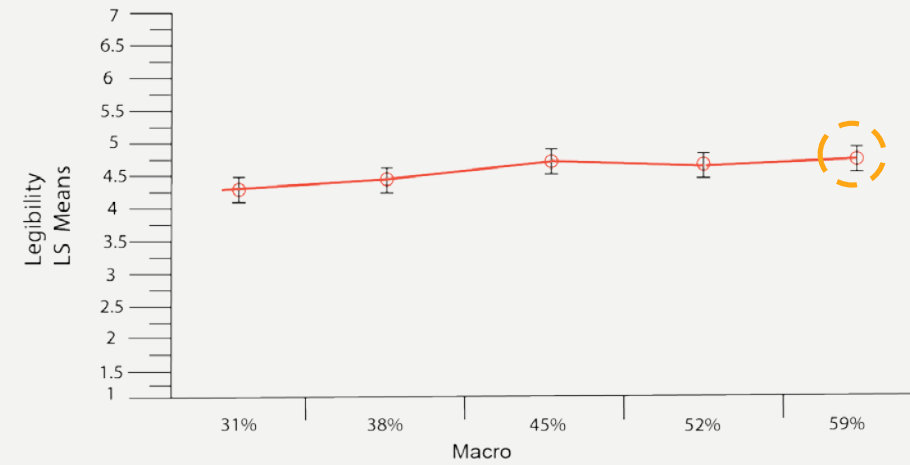
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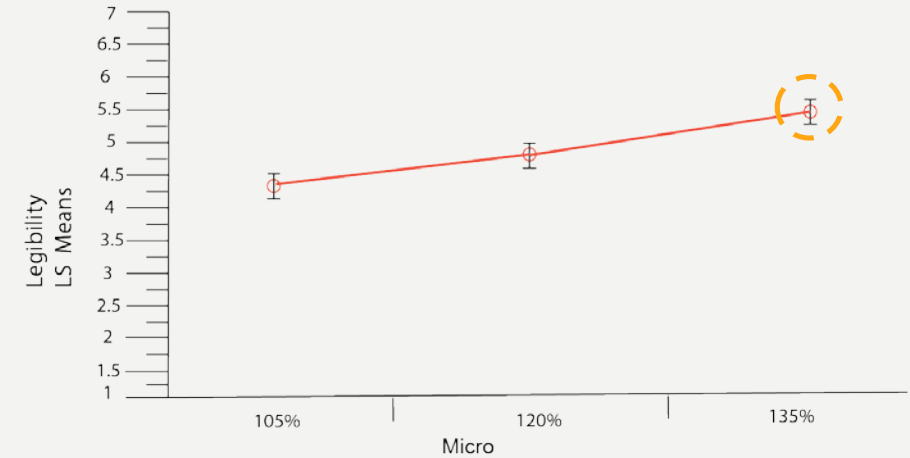


31% macro 105% micro

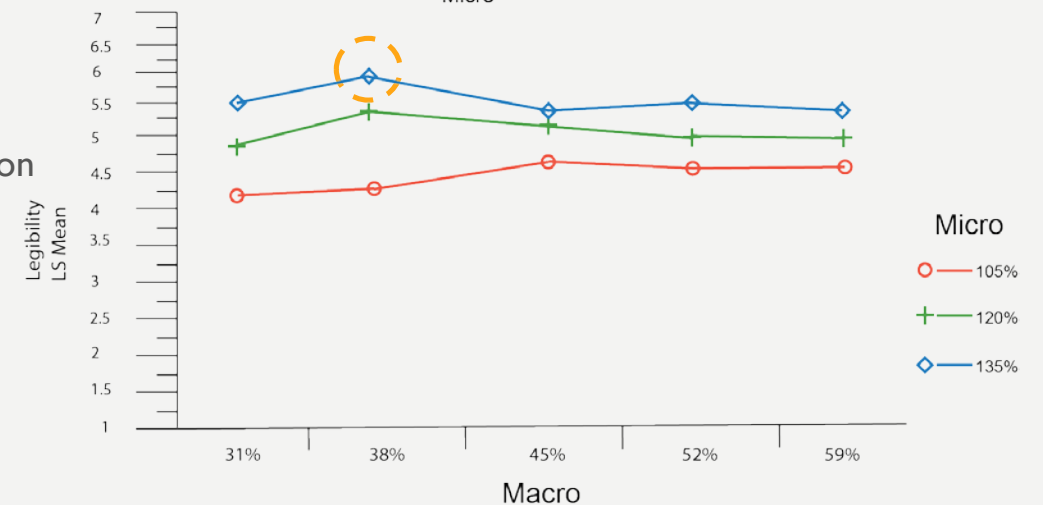
Macro



Micro



The interaction of Macro and Micro



• **Readability** ➤ Questionnaire

Fixed Effect Tests for Readability

Source	F Ratio	Prob > F
Macro	3.96	0.0034
Micro	8.57	<.0001
Macro*Micro	2.33	0.0179

The highest score

The lowest score

A GREAT QUICK DISH

Marinated Chicken Breasts with Brown Rice and Cherry

Main Ingredients:
 4 bone-in skin-on chicken breasts, trimmed and patted dry with paper
 1 1/2 Tbsp. melted butter
 10.5 oz. pkg. cherry tomatoes, halved
 1/4 cup of finely sliced red onions
 3 Tbsp. sliced kalamata olives

Marinade Ingredients:
 1 or 1 1/2 Tbsp. white oil, 1/2 Tbsp. sea salt, 1/2 Tbsp. black pepper, 1 Tbsp. maple syrup, 2 Tbsp. white wine vinegar, 3 Tbsp. orange juice, 2 Tbsp. water, 1/4 cup of chopped basil leaves, 1/4 cup of mint leaves, 150 grams of fresh tomatoes, 1/2 cup of chopped rosemary.

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Tip:
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38% macro | 135% micro

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 4 bone-in skin-on chicken breasts, trimmed and patted dry with paper
 1 1/2 Tbsp. melted butter
 10.5 oz. pkg. cherry tomatoes, halved
 1/4 cup of finely sliced red onions
 2 Tbsp. sliced kalamata olives
 2 eggs of medium brown rice
 1 Tbsp. extra virgin olive oil
 1/2 cup of crumbled feta cheese

Marinade Ingredients:
 1 or 1 1/2 Tbsp. white oil, 1/2 Tbsp. sea salt, 1/2 Tbsp. black pepper, 1 Tbsp. maple syrup, 2 Tbsp. white wine vinegar, 3 Tbsp. orange juice, 2 Tbsp. water, 1/4 cup of chopped basil leaves, 1/4 cup of mint leaves, 150 grams of fresh tomatoes, 1/2 cup of chopped rosemary, 1/2 cup of minced garlic, 150 grams of brown rice.

Directions:
 1. Preheat oven to 375 degrees. Place chicken on a baking sheet and season with spices, salt & pepper - how much or little you like. Place chicken skin side up and brush with melted butter. Roast until internal temp. reaches 160 degrees (somewhere around 25-30 minutes, depending on the size of the breasts).
 2. While chicken is roasting, toss together tomatoes, onions, vinegar, oil, salt & pepper in a medium bowl. Set aside till chicken is done.
 3. When chicken is done, add the basil, mint, rosemary and feta cheese to the tomato mixture. Serve the salad alongside the chicken and rice.

Tip:
 You can make this up to a day ahead. Sticking in the marinade will blend the flavor of this salad nicely. One of my favorite things about it is the texture. This must be the amazing garlic, or "seasoning for the mouth". That's definitely happened to me more than once. I am happy to share this delicious chicken and brown rice dinner with you.

Tip:
 I am happy to share this delicious chicken and brown rice dinner with you. It's easy and healthy and full of flavor. Mixing the salad with baked or rice is an amazing flavor combination. This is really my type of go to dinner dish. On the other hand, this dish is easy to modify for substituting chicken for a fish or tofu. If you are vegetarian, you could also pair this dish with a glass of wine to saute.

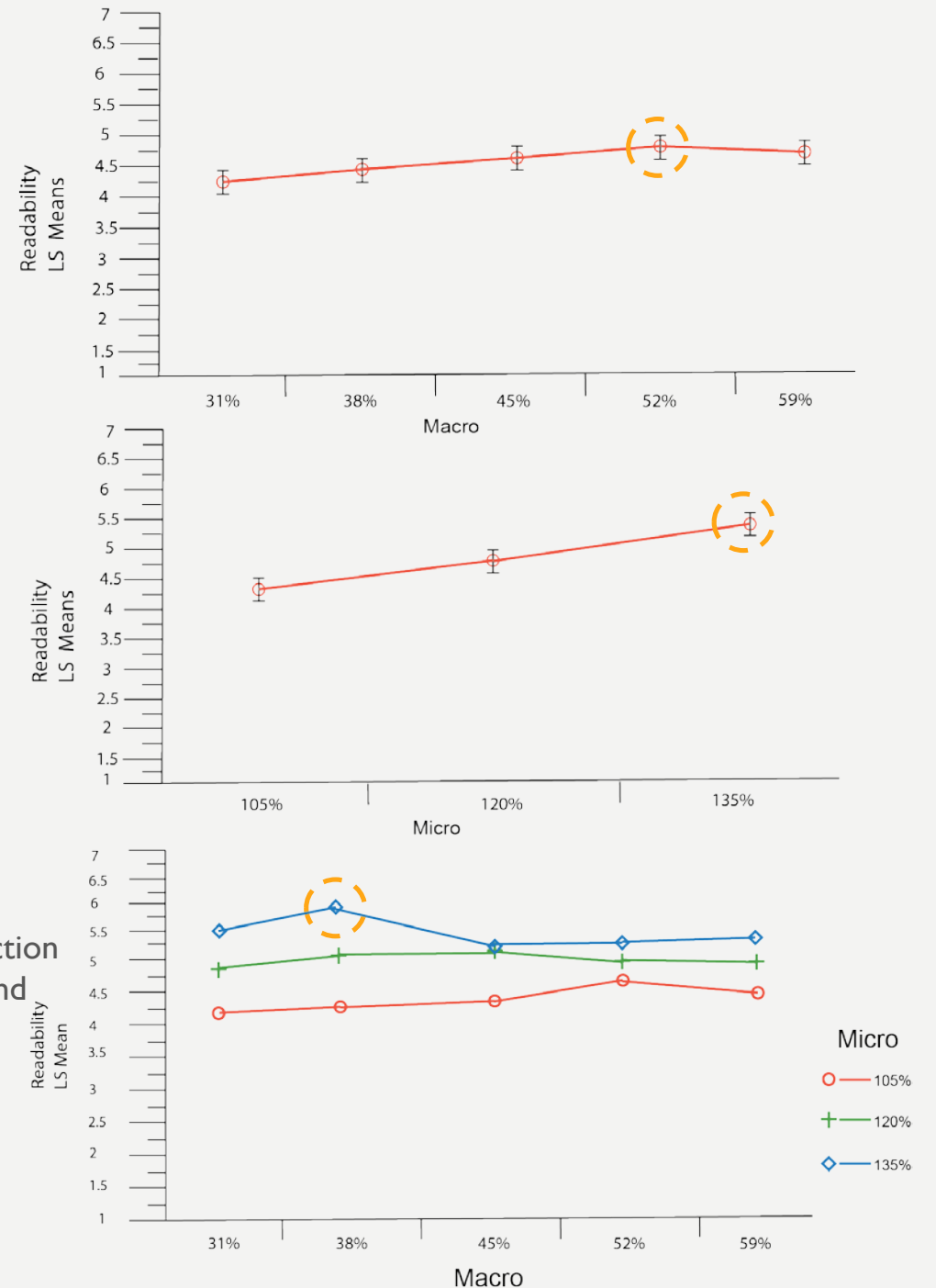


31% macro | 105% micro

The interaction of Macro and Micro

Macro

Micro



ANALYSIS OF DATA

Objective observation

- The two-way Analysis of Variance (ANOVA)
- The participants were considered as Random Effect.
- F ratio is the statistical use to test null hypothesis. $p=0.05$ was used as a cutoff value to designate statistical significance.
- Least square means are the estimated group means using the analysis procedure.

- **Legibility**

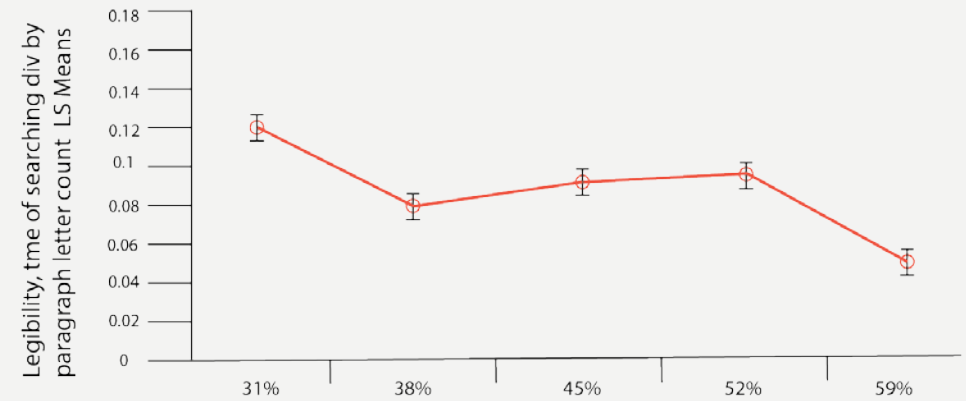
- Objective observation

Measure: **Average time, the participant used/ Total number of all letters**

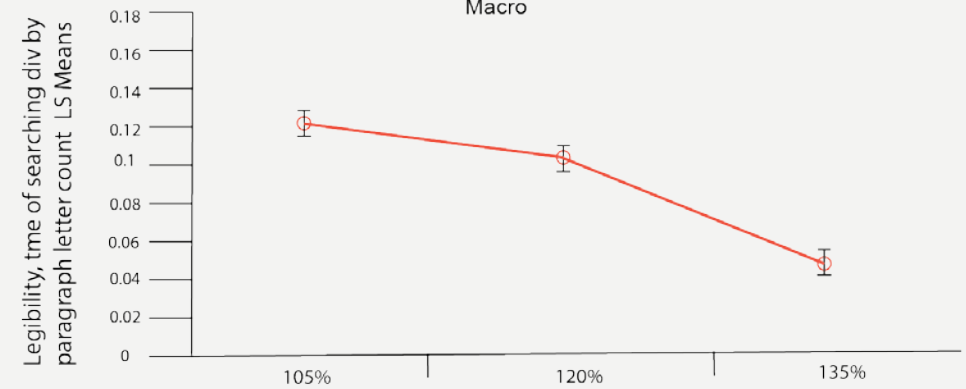
Fixed effect Tests for the distinguishing letter time

Source	F Ratio	Prob > F
Macro	11.63	<.0001
Micro	33.72	<.0001
Macro*Micro	7.33	<.0001

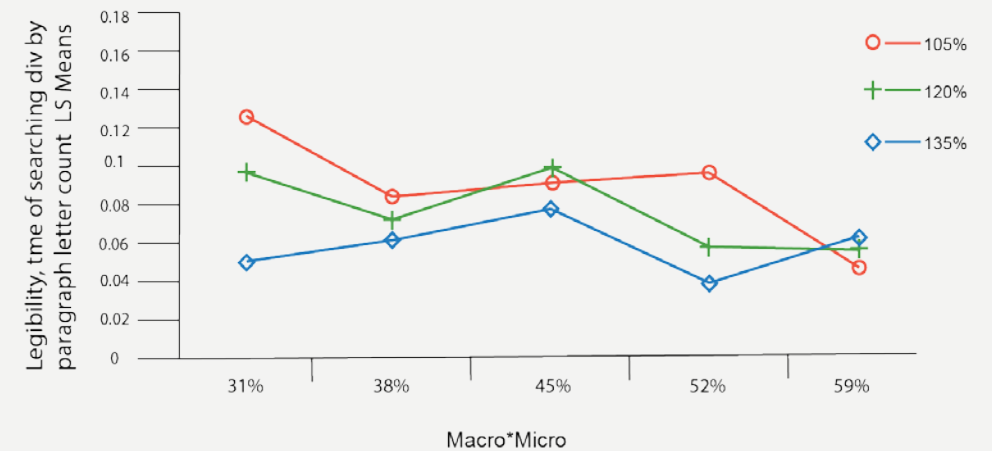
Macro



Micro



The interaction of Macro and Micro



- **Legibility**

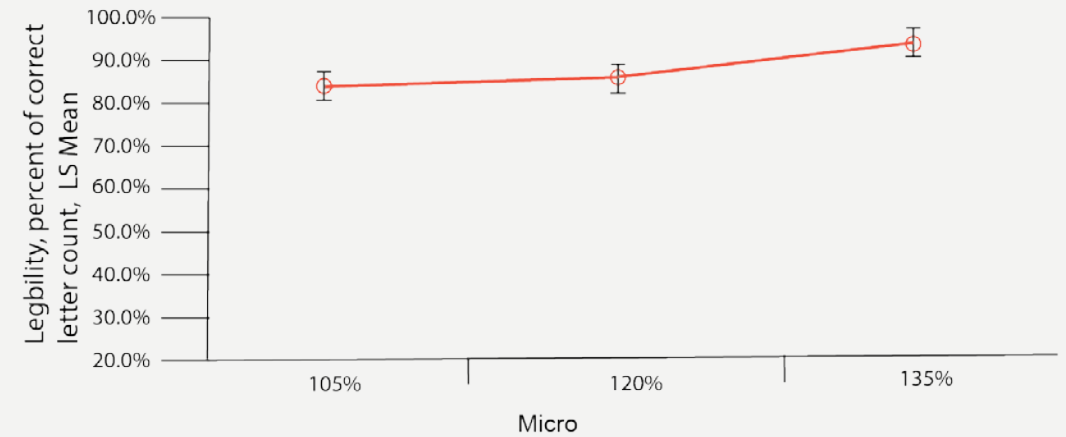
- Objective observation

Measure: Number of letters participant counted/Actual number of the specified letters

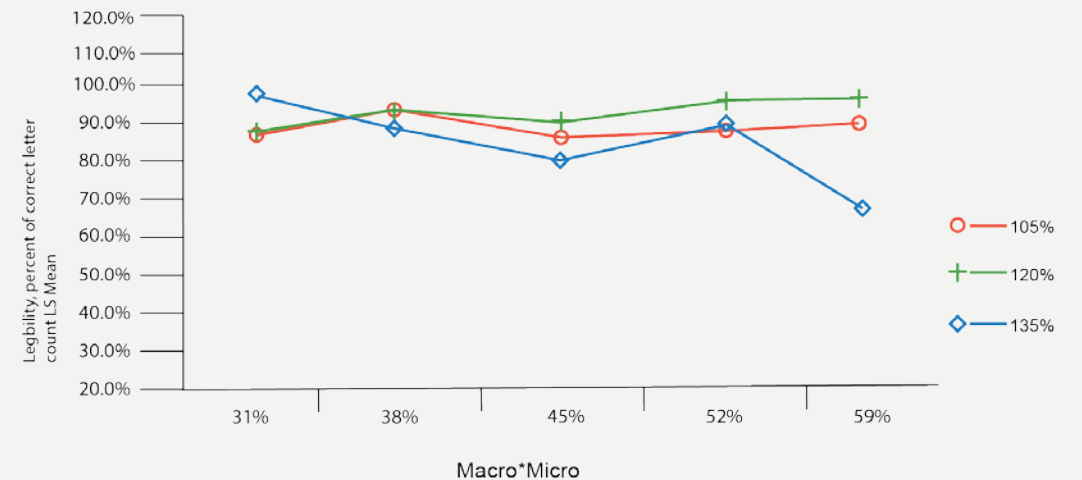
Fixed effect Tests for the percent of correct for letter counting

Source	F Ratio	Prob > F
Macro	1.20	0.3153
Micro	3.16	0.0472
Macro*Micro	3.75	0.0008

The least square plot of percent of correct for letter counting, micro white space



The least square plot of percent of correct for letter counting, Interaction of macro and micro white space



- **Readability**

- Objective observation

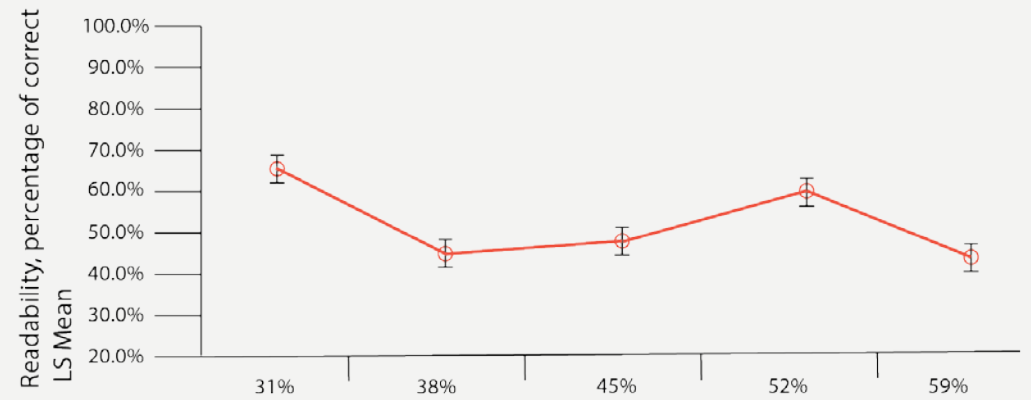
Measure: **The number of ingredients they remembered/ The total number of ingredients**

Fixed effect tests for the percent of correct recall

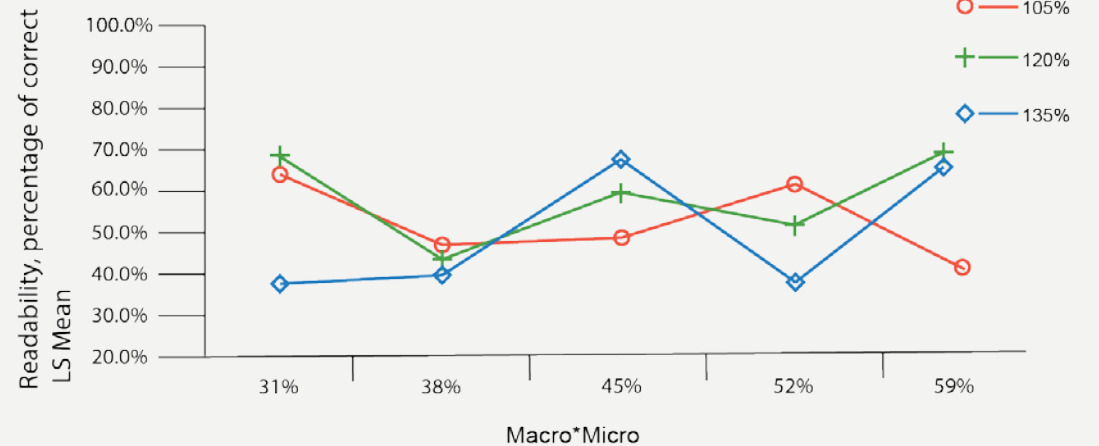
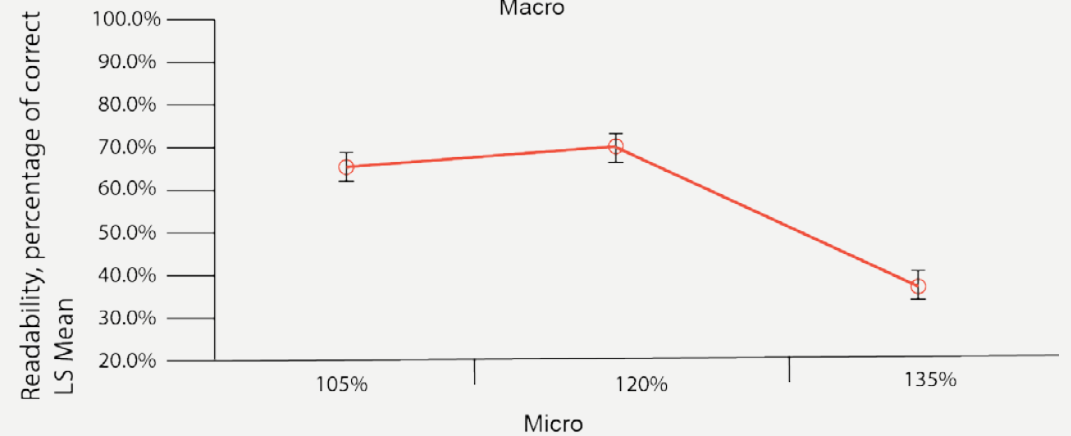
Source	F Ratio	Prob > F
Macro	3.56	0.0095
Micro	14.53	<0.0001
Macro*Micro	6.64	<0.0001

The interaction of Macro and Micro

Macro



Micro



CONCLUSIONS

Questionnaire

1. For articles in the digital editions of food magazines on an iPad platform, does white space impact the User Experience (visual aesthetics, readability and legibility) for readers?
2. If so, which dimensions of User Experience have been affected acutely by white space?
 - Three fixed effects: macro, micro and the interaction of macro and micro white space had significant impact on all three attributes of UX based on the questionnaire data.
3. Are there any exact quantitative features in terms of white space attributes that can help designers understand design patterns for digital magazines concretely and explicitly?
 - The questionnaire data demonstrated that majority of 62 participants chose the 38% macro white space and 135% micro white space as the best combination regarding all three aspects of UX.

CONCLUSIONS

Objective Observation

1. For articles in the digital editions of food magazines on an iPad platform, does white space impact the User Experience (visual aesthetics, readability and legibility) for readers?
2. If so, which dimensions of User Experience have been affected acutely by white space?
 - For the Legibility:
 - The macro, micro white space and their interaction were important factors affecting the time for distinguishing letters. Micro white space and macro/micro interaction were significant for the percent of correct letter counting.
 - Macro white space didn't have significant effect on the percent of correct for letter counting.
 - For the Readability all three effects were significant.
3. Are there any exact quantitative features in terms of white space attributes that can help designers understand design patterns for digital magazines concretely and explicitly?
 - 135 % Micro white space had the most significant effect on legibility.
 - 120% Micro white space had the most positive effect on readability.

FUTURE RESEARCH

- In the future, the study of the effects of negative space as the generalization of the white space concept can be conducted with different colors of the background. White text on the black background is an example.
- Choice of different letters for the legibility study may reveal different effects of Macro and Micro white space and can be a goal for the future research.
- White space on the mobile devices.

REFERENCE

- Shird, Lori Kay, (2003). *Examining usability and its effects on user satisfaction and user preference for interface design*
- Lee, A.T. (2000). Web site usability, usefulness, and visit frequency. *Human Factors and Ergonomics Society Annual Meeting Proceedings. 1*, p. 404. Santa Monica: Human Factors
- Amin, M., Rezaei, S., & Abolghasemi, M. (2014). *User satisfaction with mobile websites: the impact of perceived usefulness, perceived ease of use and trust*, *Nankai Business Review International*, 5 (3), pp. 258-274.
- Kripintiris, Konstantinos Efstratios, *Web Aesthetics And Usability: An Empirical Evaluation Of White Space*, 2008
- Zdralek, James, *White Space: How much nothing should there be?*, 2003
- Pracejus, John W.; O'Guinn, Thomas. C; Olsen, G Douglas, *When white space is more than "burning money": Economic signaling meets visual commercial rhetoric*, 2013

THANK YOU!!!!

Q&A