

Conceptual Constraints And The Graphic Design Process:

**An Investigation Into Creativity And How Self-Imposed
Conceptual Constraints Can Affect Banal Information**

Philippe Jean

**A Thesis Submitted to The Faculty
Of Graduate Studies In Partial Fulfillment Of The Requirements
For The Degree Of Thesis Of Master Of Design**

**Graduate Program In Design
York University
Toronto, Ontario**

August 2015

© Philippe Jean, 2015

Abstract

The discipline of graphic design has an important role to play in developing how information is conveyed and consumed. This thesis has focused on uncovering how including self-imposed conceptual constraints in the design process can encourage creativity. Using weather data, I explored how such constraints can be used to liberate banal information from its structured, restrictive and mass consumed context, and ultimately participate in developing alternative meanings.

Thus, through an exploratory approach to design practice, this investigation examined how conceptual constraints under three "creative operations" (combination, analogy, mutation) structured my work to allow for richer visual interpretations of banal information.

Furthermore, by juxtaposing conceptual constraints with the "creative operations," I generated different visual propositions in order to disrupt routine processes in design and promote new and different designs. This research demonstrated how rules and conceptual constraints are viewed inside the context of graphic design. It also demonstrated how this framework for exploration can contribute to my own practice by allowing me to develop alternative design processes, and, ultimately, richer visual propositions for a given design problem.

Acknowledgements

I want to start by saying thank you to my supervisor Sandra Gabriele, and my advisor David Gelb. I cannot say enough to express my deep gratitude to them. Throughout the entire experience, they were incredibly professional and helpful, whether it was in class, during a committee meeting, or in formal and informal discussions. Sandra and David always believed in my potential, and I cannot thank them enough for nudging me out of my comfort zone, and pushing me to explore various facets of my research I would not have discovered without them.

In addition, I wish to note that this project would not have been possible without the support of my amazing parents Jocelyne Rioux and Marcel Jean. Despite the 948 km between us during this process, they have always been there for me, providing support, guidance and encouragement. Mom and dad, “Merci” for inspiring me to believe in my dreams and to follow my passion. I also wish to thank my sister Valerie Jean, for her support and encouragement.

Of course, I must also thank the wonderful colleagues in my program, including Mala’a Al-Amoudi, Christine Chiou, Emmie Tsumura, Krishna Balakrishnan and Nicole Beno.

Finally, I want to thank Gabrielle Lajoie-Bergeron, and, last but not least, Marie-Noëlle Hébert for her help and support in terms of writing and thinking structure.

Table of Contents

| | |
|---|------------|
| Abstract | ii |
| Acknowledgements | iii |
| Table of Contents | iv |
| List of Figures | iv |
| 1. Introduction | 1 |
| 2. Research Statement | 2 |
| 3. Concept Of Weather As Banal | 5 |
| 3.1 Weather As Banal In Terms Of An Overabundance Of Data Available | 6 |
| 3.2 Weather As Banal In Terms Of Lack Of Written Expressiveness | 13 |
| 4. Conceptual Art | 16 |
| 5. Conditional Design | 21 |
| 6. Generative Design | 23 |
| 7. First Principles In Graphic Design And Conceptual Constraints | 26 |
| 8. Creative Operations | 29 |
| 9. Process Of Design | 34 |
| 10. Combination As A Creative Operation For Design Exploration | 37 |
| 10.1 Wednesday, A Mix Of Sun And Cloud, High 22 | 38 |
| 10.1.1 Analysis | 39 |
| 10.1.2 Synthesis | 41 |
| 10.1.3 Evaluation | 44 |
| 11. Analogy As Creative Operation For Design Exploration | 49 |
| 11.1 Weather Yearbook | 50 |
| 11.1.1 Analysis | 50 |
| 11.1.2 Synthesis | 51 |
| 11.1.3 Evaluation | 57 |

| | |
|--|-----------|
| 11.2 Weather Shaker Mobile Application | 58 |
| 11.2.1 Analysis | 58 |
| 11.2.2 Synthesis | 59 |
| 11.2.3 Evaluation | 63 |
| 12. Mutation As Creative Operation For Design Exploration | 65 |
| 12.1 Distortional Weather Report Poster | 67 |
| 12.1.1 Analysis | 67 |
| 12.1.2 Synthesis | 69 |
| 12.1.3 Evaluation | 76 |
| 12.2 Typographic Weather Report Book | 77 |
| 12.2.1 Analysis | 77 |
| 12.2.2 Synthesis | 78 |
| 12.2.3 Evaluation | 83 |
| 13. Conclusion | 84 |
| 14. Bibliography | 91 |

List of Figures

| | | |
|------------|--|----|
| Figure 1: | The Weather Network Television, <i>February 18 2015, 5:40pm</i> | 6 |
| Figure 2: | Canadian Weather Website, <i>June 2014</i> | 8 |
| Figure 3: | The Weather Network platforms, <i>Three weather platforms</i> | 10 |
| Figure 4: | Toronto Star, <i>Weather Reports from 1935 to 2015</i> | 11 |
| Figure 5: | Friedman, <i>Weather reports, student project</i> | 13 |
| Figure 6: | Goldsmith, <i>The Weather</i> | 14 |
| Figure 7: | Morris, <i>CardFile</i> | 17 |
| Figure 8: | LeWitt, <i>From the word(s) "Art"</i> | 18 |
| Figure 9: | LeWitt, <i>The Location of Yellow and Red</i> | 18 |
| Figure 10: | LeWitt, <i>Four Color Drawing</i> | 19 |
| Figure 11: | Blauvelt and Koert Van Mensvoort, <i>Conditional Design: Workbook</i> | 22 |
| Figure 12: | Jean, <i>Processing example</i> | 24 |
| Figure 13: | Onformative, <i>data visualization</i> | 24 |
| Figure 14: | E. Lupton and Jennifer Cole Philips, <i>Graphic Design: The New Basics</i> | 26 |
| Figure 15: | Cross, <i>Model of design</i> | 30 |
| Figure 16: | Jean, <i>Investigation of thesis subject through three "creative operations"</i> | 32 |
| Figure 17: | Cross, <i>The Design Process</i> | 34 |
| Figure 18: | Edouard, <i>The System Maintains</i> | 37 |
| Figure 19: | Wednesday A mix of Sun and Cloud High 22. Environment Canada Website, <i>Wednesday October 1 2014,</i> | 38 |
| Figure 20: | Wednesday A mix of Sun and Cloud High 22. Jean, <i>Three extracted weather items</i> | 39 |
| Figure 21: | Wednesday A mix of Sun and Cloud High 22. Jean, <i>Configuration and condition of automation process</i> | 40 |
| Figure 22: | Wednesday A mix of Sun and Cloud High 22. Jean, <i>Scaling characteristics of the three items</i> | 41 |
| Figure 23: | Wednesday A mix of Sun and Cloud High 22. Jean, <i>Script running during the automation</i> | 42 |
| Figure 24: | Wednesday A mix of Sun and Cloud High 22. Jean, <i>6 of 13 608 automations combinations</i> | 43 |

| | | |
|------------|---|----|
| Figure 25: | Wednesday A mix of Sun and Cloud High 22. Jean, <i>Three successful examples outputs by automation established from criteria</i> | 45 |
| Figure 26: | Wednesday A mix of Sun and Cloud High 22. Jean, <i>Three unsuccessful examples outputs by automation established from criteria</i> | 45 |
| Figure 27: | Wednesday A mix of Sun and Cloud High 22. Jean, <i>Criteria for successful an original reading experience output</i> | 46 |
| Figure 28: | Wednesday A mix of Sun and Cloud High 22. Jean, <i>Confrontation between me (Man), and a computer (Machine)</i> | 47 |
| Figure 29: | Wednesday A mix of Sun and Cloud High 22. Jean, 3 of 129 visual propositions generated manually | 47 |
| Figure 30: | Batory, <i>Danse de Taipei à l'Afrique</i> | 49 |
| Figure 31: | Batory, <i>Festival de Marne</i> | 49 |
| Figure 32: | Precipitation Year book. Jean, <i>Sky condition analogy</i> | 52 |
| Figure 33: | Precipitation Year book. Jean, <i>Precipitations icons analogy</i> | 53 |
| Figure 34: | Precipitation Year book, Jean, <i>Size value for precipitation visuals</i> | 54 |
| Figure 35: | Precipitation Year book. Jean, <i>January 9 2014</i> | 55 |
| Figure 36: | Precipitation Year book. Jean, <i>January 25 2014</i> | 55 |
| Figure 37: | Precipitation Year book. Jean, <i>October 2 2014</i> | 55 |
| Figure 38: | Precipitation Year book. Jean, <i>October 31 2014</i> | 55 |
| Figure 39: | Precipitation Year book. Jean | 56 |
| Figure 40: | The Weather Shaker. AccuWeather, <i>Friday, April 24 2015 at 11:38pm</i> | 59 |
| Figure 41: | The Weather Shaker. Jean, <i>Content division</i> | 60 |
| Figure 42: | The Weather Shaker. Jean, <i>Minimalist interface</i> | 61 |
| Figure 43: | The Weather Shaker. Jean, <i>Geometric flat shapes</i> | 62 |
| Figure 44: | The Weather Shaker. Jean, <i>Typography</i> | 62 |
| Figure 45: | The Weather Shaker. Jean, <i>Geometric 3D perspective</i> | 63 |
| Figure 46: | Thierry Chancogne et al, <i>L'écartelage ou l'écriture de l'espace d'après Pierre Faucheux</i> | 66 |
| Figure 47: | Distortional Weather Report Poster. Toronto Star, April 21 2015 <i>Weather Report</i> | 68 |
| Figure 48: | Distortional Weather Report Poster. Jean, <i>Strokes</i> | 69 |
| Figure 49: | Distortional Weather Report Poster. Jean, <i>Circles</i> | 69 |

| | |
|---|----|
| Figure 50: Distortional Weather Report Poster. Jean, <i>Black strokes</i> | 70 |
| Figure 51: Distortional Weather Report Poster. Jean, <i>Triangles</i> | 70 |
| Figure 52: Distortional Weather Report Poster. Jean, <i>Time of day information</i> | 70 |
| Figure 53: Distortional Weather Report Poster. Jean, <i>Morning</i> | 72 |
| Figure 54: Distortional Weather Report Poster. Jean, <i>Afternoon</i> | 73 |
| Figure 55: Distortional Weather Report Poster. Jean, <i>Evening</i> | 74 |
| Figure 56: Distortional Weather Report Poster. Jean, <i>Overnight</i> | 75 |
| Figure 57: Typographic Weather Report Book. Toronto Star, <i>April 4 2015 Weather Report</i> | 78 |
| Figure 58: Typographic Weather Report Book. Jean, <i>Temperature emphasizing</i> | 80 |
| Figure 59: Typographic Weather Report Book. Jean, <i>Time emphasizing</i> | 80 |
| Figure 60: Typographic Weather Report Book. Jean, <i>Sky conditions emphasizing</i> | 81 |
| Figure 61: Typographic Weather Report Book. Jean, <i>Wind direction emphasizing</i> | 81 |
| Figure 62: Typographic Weather Report Book. Jean | 82 |

1. Introduction

In today's world, access to news and information is more convenient than ever. People can easily obtain regular updates on relevant data they want and need. Some of this information is vital because it allows specialized groups or individuals to make key decisions that can have a major impact on the lives of others. For example, according to current or predicted weather conditions, air traffic controllers may decide to delay the departure of an aircraft, which could potentially avoid an incident. Or, on a less impactful level, weather data may influence what an individual chooses to wear on a particularly cold day.

However, weather data is often perceived as banal, uninspiring and dull despite its importance in everyday life. This perception is driven by two factors :

- The large overabundance of available data (Nealon, 2013,111) ; and,
- The lack of written expressiveness (i.e. uninteresting content) (Goldsmith, 2004).

Despite the limitations posed by these factors, the discipline of graphic design has an important role to play in shaping how banal information is conveyed and consumed. This investigation explored the viability of reinventing conventions of representation used in the display of weather information, thus challenging how banal information is commonly viewed. This research also examined how conceptual constraints may be satisfied under three "creative operations," in order to allow for richer visual interpretations of banal information, more specifically weather data, and to empower readers to develop alternative meanings from the information presented.

2. Research Statement

Banal information, such as weather data, is typically displayed via a neutral visual structure that sacrifices originality and creativity for speed and ease of reading. As a result, the way in which people interpret and perceive banal information can be compromised. The content is not the root cause of this perception, but rather, it is the uncreative, un-engaging and uninteresting manner in which it is presented. My thesis therefore focused on *how self-imposed conceptual constraints could be included within the design process in order to encourage creativity and to liberate weather data from its structured, restrictive and mass consumed context, ultimately allowing readers to develop alternative meanings from its interpretation.*

This approach also promoted transparency with respect to integrating visual propositions within my design process. This was accomplished via specific “creative operations,” which unleashed a new visual experience, and opened new horizons in my work. Ultimately, my goal was to change the perception of how rules and constraints may be viewed inside the context of graphic design. I endeavored to demonstrate that constraints are not necessarily restrictive and limiting. Rather, if used effectively, conceptual constraints can enable new levels of freedom. This is especially the case when such constraints (i.e. rules) are voluntarily designed, conceptualized and implemented, rather than being forcibly imposed. In such instances, they can become a source of inspiration, and encourage critical thinking and creativity.

My investigation also aimed to advance the role and perception of professional graphic designers. That is, instead of viewing graphic designers as exclusively generators of visual solutions, this research emphasized that they should be perceived

as visionaries who make and enforce their own rules and also as curators of visual outputs.

According to Nigel Cross, a specialist in design methods and head of the design discipline at the Open University, the design process can be divided into three stages : analysis, synthesis and evaluation (1984, 84). He believes that this approach allows for both logical and pragmatic thinking, as well as imaginative and creative thinking.

During the analysis stage, the main objective for a designer is to frame the design problem. Thus, by observing, collecting and classifying information related to the design problem, the designer can define his or her objectives, as well set the criteria for evaluating successful propositions.

In the synthesis stage, the main objective for a designer is to maximize creativity and imagination, in order to develop visual propositions as per the objectives established in the preceding analysis stage. Also in this stage, a designer can generate several proposals, either in part or whole, that ultimately can be linked and combined.

In the evaluation stage, the main objective for a designer is to determine if the suggested proposal or proposals are satisfactory. This can be done via a performance evaluation methodology by checking to see if the criteria established in the analysis stage has been partially or completely satisfied. Furthermore, the evaluation stage can also take into consideration a designer's subjectivity. That is, this stage allows a designer to interpret the objective and goal to be achieved by understanding and controlling visual forms.

This stage helps advance the designer towards the ultimate goal of evaluating the advantages and disadvantages of proposed solutions, as well as generating comments and feedback on visual propositions for correction and adjustment.

In light of Cross' above-noted propositions, this visual exploration was undertaken to determine if weather-related content could invoke more than a single reading experience, by being re-invented visually into something original and dynamic.

Ultimately, an attempt was made to apply conceptual constraint-driven tactics in order to open doors for creativity for both designers and readers, with the aim of transforming what has historically been a dull and neutral framework for disseminating weather data, into something expressive and meaningful that would invite new understandings, and encourage new interpretations.

3. Concept Of Weather As Banal

As explained by Dr. Jeffrey T. Nealon, professor of English and philosophy at University Park, the fundamental ordinariness of the weather translates into everyday life as well :

There is nothing more banal and boring than the weather. In fact, the weather often functions as a privileged figure for banality itself; the lingua franca of everyday speech. The weather constitutes a pervasive discourse, nearly devoid of content, in which we can all safely engage; as such, connecting with others superficially, without running the risk of offence (Nealon, 2013, 109).

I believe that the research of T. Nealon provides a framework for observing weather content as something that is:

- banal, due to excessive visibility;
- necessary, as it allows viewers them to make informed decisions within their daily lives; and
- socially relevant, as it allows us to connect due to its universal acceptability as a topic for discussion with strangers.

Through my research, I attempted to establish an original relationship between the weather content and its visual display, so that it would be perceived as rich, engaging, interesting and surprising.

3.1 Weather As Banal In Terms Of An Overabundance Of Data Available

The excessive visibility of the data generated by the overabundance of diffusion platforms participates in augmenting the public perception of weather data as banal information.

This concept can be grasped through a cultural studies perspective, based on theoretical contributions of the aforementioned Dr. Jeffrey T. Nealon and Dr. Gregory Seigworth, who contend that “banal information is broadly associated with the negative aspects of media: overrepresentation, excessive visibility and information overload” (Nealon, 2013, 111). Consequently, the information has less impact and importance; especially since it is updated several times a day.

In Canada, *The Weather Channel* (Figure 1) is a prime example of how weather related information is continuously presented and updated.



Figure 1

This screen capture illustrates the excess of weather information presented on *The Weather Network Television Channel*, February 18 2015, 5:40pm.

As shown in Figure 1, there is an excess of weather information presented on multiple screens for several cities, using both a map graphic and sidebar frame. There is little visual contrast between temperatures, city names and other elements. This visual structure replays several times throughout the day, with the only change being quantitative (e.g. temperature or days).

However, it is not just current weather data that is presented in a banal, uncreative and ordinary fashion. The same can be said of historical or archived data. For example, the *Government of Canada Website* (Figure 2) has a wealth of meteorological data from Toronto's Buttonville Airport from 1986 onwards, including: maximum temperature, minimum temperature, total rain, total snow, total precipitation, wind direction and wind speed. This large amount of information is presented in a banal and uninspiring format that consists exclusively of quantitative data (alphanumeric numbers) organized in a table format (columns and rows). This type of visual representation allows for quick and fast reading, and to show quantitative information in a clean "pure" manner. However, I believe that this structure participates in rendering weather data as "dead" information, because the visual display does not vary in accordance to the value of the content represented.











| Daily Data Report for June 2014 | | | | | | | | | | | |
|---|---|---|--|--|--|---|---|---|---|-----------------------------|--|
| | Max Temp °C  | Min Temp °C  | Mean Temp °C  | Heat Deg Days  | Cool Deg Days  | Total Rain mm  | Total Snow cm  | Total Precip mm  | Snow on Grnd cm  | Dir of Max Gust 10's deg | Spd of Max Gust km/h  |
| DAY | | | | | | | | | | | |
| 01 † | 25.7 | 7.2 | 16.5 | 1.5 | 0.0 | 0.0 | 0.0 | 0.0 | | | <31 |
| 02 † | 27.9 | 10.6 | 19.3 | 0.0 | 1.3 | 1.4 | 0.0 | 1.4 | | 18 | 37 |
| 03 † | 27.1 | 11.0 | 19.1 | 0.0 | 1.1 | 13.2 | 0.0 | 13.2 | | 30 | 39 |
| 04 † | 23.1 | 10.3 | 16.7 | 1.3 | 0.0 | 0.0 | 0.0 | 0.0 | | 33 | 33 |
| 05 † | 17.4 | 10.5 | 14.0 | 4.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 32 | 39 |
| 06 † | 24.7 | 8.4 | 16.6 | 1.4 | 0.0 | 0.0 | 0.0 | 0.0 | | 33 | 32 |
| 07 † | 25.9 | 7.2 | 16.6 | 1.4 | 0.0 | 0.0 | 0.0 | 0.0 | | | <31 |
| 08 † | 21.0 | 11.4 | 16.2 | 1.8 | 0.0 | 1.2 | 0.0 | 1.2 | | | <31 |
| 09 † | 27.1 | 13.7 | 20.4 | 0.0 | 2.4 | 0.0 | 0.0 | 0.0 | | | <31 |
| 10 † | 24.7 | 13.1 | 18.9 | 0.0 | 0.9 | 0.0 | 0.0 | 0.0 | | | <31 |
| 11 † | 23.2 | 16.4 | 19.8 | 0.0 | 1.8 | 10.6 | 0.0 | 10.6 | | | <31 |
| 12 † | 26.1 | 16.5 | 21.3 | 0.0 | 3.3 | 24.6 | 0.0 | 24.6 | | | <31 |
| 13 † | 24.5 | 11.4 | 18.0 | 0.0 | 0.0 | 0.8 | 0.0 | 0.8 | | 31 | 37 |
| 14 † | 19.9 | 10.0 | 15.0 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 32 | 32 |
| 15 † | 21.6 | 9.3 | 15.5 | 2.5 | 0.0 | 0.0 | 0.0 | 0.0 | | | <31 |
| 16 † | 25.4 | 10.4 | 17.9 | 0.1 | 0.0 | 3.0 | 0.0 | 3.0 | | | <31 |
| 17 † | 29.7 | 13.6 | 21.7 | 0.0 | 3.7 | 28.8 | 0.0 | 28.8 | | 25 | 69 |
| 18 † | 24.5 | 17.2 | 20.9 | 0.0 | 2.9 | 3.4 | 0.0 | 3.4 | | | <31 |
| 19 † | 24.7 | 14.3 | 19.5 | 0.0 | 1.5 | 0.0 | 0.0 | 0.0 | | | <31 |
| 20 † | 22.6 | 13.0 | 17.8 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | | | <31 |
| 21 † | 25.3 | 13.0 | 19.2 | 0.0 | 1.2 | 0.0 | 0.0 | 0.0 | | | <31 |
| 22 † | 25.6 | 10.9 | 18.3 | 0.0 | 0.3 | 0.0 | 0.0 | 0.0 | | | <31 |
| 23 † | 23.2 | 11.4 | 17.3 | 0.7 | 0.0 | 0.2 | 0.0 | 0.2 | | | <31 |
| 24 † | 27.4 | 18.2 | 22.8 | 0.0 | 4.8 | 9.8 | 0.0 | 9.8 | | 28 | 59 |
| 25 † | 23.8 | 18.7 | 21.3 | 0.0 | 3.3 | 1.4 | 0.0 | 1.4 | | | <31 |
| 26 † | 27.6 | 15.2 | 21.4 | 0.0 | 3.4 | 0.6 | 0.0 | 0.6 | | | <31 |
| 27 † | 27.1 | 13.9 | 20.5 | 0.0 | 2.5 | 0.0 | 0.0 | 0.0 | | | <31 |
| 28 † | 29.4 | 15.4 | 22.4 | 0.0 | 4.4 | 0.0 | 0.0 | 0.0 | | | <31 |
| 29 † | 29.3 | 17.4 | 23.4 | 0.0 | 5.4 | 3.4 | 0.0 | 3.4 | | 28 | 46 |
| 30 † | 30.0 | 20.3 | 25.2 | 0.0 | 7.2 | 0.0 | 0.0 | 0.0 | | 18 | 39 |
| Sum | | | | 17.9 | 51.4 | 102.4 | 0.0 | 102.4 | | | |
| Avg | 25.2 | 13.0 | 19.1 | | | | | | | | |
| Xtrm | 30.0 | 7.2 | | | | | | | | 25 | 69 |
| Summary, average and extreme values are based on the data above. | | | | | | | | | | | |

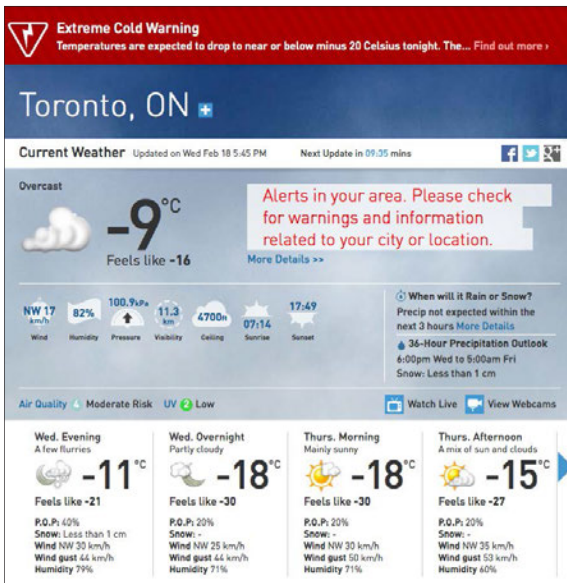
Figure 2

Archived weather data is presented in an uninspiring format consisting exclusively of quantitative data organized in a table format. Daily Data Report for June 2014, Toronto Buttonville Airport. *Canadian Weather Website*, accessed November 14, 2014, <http://goo.gl/qT8b3D>.

A major feature of weather information is that it is constantly updated on a variety of platforms, which generates excessive visibility. For example, *The Weather Network* has developed a universal platform that simultaneously updates weather information on their TV channel, as well as their website and mobile application (Figure 3). On February 18, 2015 at 6:22pm and 6:23pm, screen captures were taken of the *The Weather Network's* TV channel, its website, and its mobile app.



The Weather Network, Television



The Weather Network, Website



The Weather Network, Mobile App

Figure 3

Simultaneous screen captures taken on February 18, 2015 from three of *The Weather Network* platforms (TV, website and mobile app) demonstrating that despite the three different media, the representation of the content remains virtually identical day after day, since the visual structure is consistently based on the table format.

These three platforms (Figure 3) illustrate that the visual system in place has been designed for viewer accessibility and rapid updating of data. This is illustrated by how the content is displayed in columns for all three platforms, promoting accessibility, but limiting creativity and visual interpretation.

The same observation can be made from viewing archived newspapers. The figure below (Figure 4) illustrates a comparison of weather reports published by the *Toronto Star* on February 18 for five different years: 1935, 1955, 1975, 1995 and 2015.

THE WEATHER
MONDAY-TUESDAY, FEBRUARY 18-19
 The local forecast is: Partly cloudy tonight and Tuesday, with a little lower temperature; snowflurries.
 The observation at noon to-day showed: Highest temperature yesterday, 30; lowest this morning, 22; snowfall, 1.1.
 Yesterday's mean temperature was 24 or 4 degrees above the average. The mean temperature for the corresponding day last year was 18 or 6 degrees below the average.

| Time | Temp. | Wind | Weath. | Hum. |
|--------|-------|---------|---------|------|
| 8 a.m. | 29 | S.W. 24 | Cloudy | 84 |
| Noon | 31 | W. 24 | Snowing | 55 |

Bareneter: 8 a.m. 29.21; noon, 29.32.
 The meteorological office estimates that the lowest the temperature will drop during the night is estimated at 30 degrees above.

To-day's Calendar
 Sun rises 7:15 a.m.
 Sun sets 5:51 p.m.
 Synopsis: A deep low area centered near the Grand Banks and moving rapidly northward has caused moderate to heavy snowfalls in the maritimes and Newfoundland. Light snowfalls have also occurred in Ontario, Quebec and Manitoba. It has been a little colder in Eastern Canada but mild throughout the west. Pressure continues low from the great lakes eastward and shallow low areas are centered over northern Manitoba and Minnesota, while high pressure covers the greater part of the west portion of the continent.

Toronto Star, 1935

THE WEATHER
FRIDAY-SATURDAY
 The Toronto and vicinity forecast is: Sunny today; Saturday cloudy with rain, occasionally mixed with snow, beginning in the afternoon; milder. Winds light today, south 20 mph Saturday.
 Mean yesterday 28.8 above av.
 High yesterday, 12.05 a.m., 33.
 Low yesterday, midnight, 22.
 Low today, to 7 a.m., 6.40, 19.
 High since 1841 (1949), 53.
 Low since 1841 (1885), -10.
 A year ago: High 49, low 32.
 Wind yesterday, 7 a.m., NW 12; 1 p.m., NW 12; 2 p.m., NW 6.
 Time Temp. Wind Weather Hum.
 7 a.m. 20 W 3 Clear 78
 Noon 31 W 6 Clear 69
 Bareneter: 7 a.m. sea level, 30.47; noon, sea level, 30.47.
 Sun sets tonight at 5:51 p.m. EST.
 Sun rises tomorrow at 7:12 a.m. EST.

Toronto Star, 1955

A 2** Tues., Feb. 15, 1975

Weather

Clearing tomorrow high 30

TORONTO FORECAST
 Clearing Wednesday. Temperature steady near 30 F, -1 Celsius.

Toronto Star, 1975

Metro area and vicinity

TODAY
 High 4 Sunny with a few clouds and mild.

TONIGHT
 Low 1 Clouding over, the chance of a shower or melting flurry late at night.

TOMORROW
 High/Low 4/5 A morning shower or flurry, a glimpse of afternoon sun.

Extended forecast

MONDAY
 Cloudy, a flurry or two likely. High/Low 2/-3

TUESDAY
 Partly sunny. High/Low 1/-6

WEDNESDAY
 Sunny to partly cloudy. High/Low 2/-5

Toronto Star, 1995

TODAY'S FORECAST: HIGH -8 LOW -21 *Toronto downtown*

| Morning 8 a.m. | Afternoon 2 p.m. | Evening 7 p.m. | Overnight low |
|--|--|--|--|
| -14 Cloudy RealFeel: -18 Wind W 8-16 km/h | -8 Cloudy RealFeel: -15 Wind W 12-25 km/h | -12 Clouds and very cold RealFeel: -20 Wind NW 15-25 km/h | -21 Cloudy and very cold RealFeel: -30 Wind NW 15-25 km/h |

Toronto Star, 2015

Figure 4
 Comparison of 5 Weather Reports from the *Toronto Star* from 1935 to 2015. All these weather reports are mainly made up of text, which ultimately consists of a un-engaging manner to express weather conditions.

Each of these five examples uses text to express weather conditions. The weather reports from 1935 and 1955 focused on text descriptions without adding icons, and with little attempt to apply a hierarchy. The weather reports from 1995 and 2015, which featured larger columns, visual icons, and less text. There is also a special mention of the weather report in the editorial content from 1975, which used the shape of the flag from the newspaper's logo to call attention to the weather section.

The most recent example from 2015 weather report sacrifices originality and creativity, in exchange for an approach that lends itself accessibility and comprehension. As a result, weather data has less impact; not because of the content itself, but, as noted above, due to the uncreative visual representation, and un-engaging, conventional visual structures and displays.

My research attempted to steer away from this standard approach, and explored the possibility of enhancing the meaning of weather data through original visual representation. In his work with students, designer and educator Dan Friedman was similarly inspired along this same line of inquiry :

Without using images or ornamentation, and with a message as ordinary as the daily weather report, Friedman instructed his students to concentrate on manipulating composition, weight, scale, letter spacing and other typographic devices in order to create the desired tone, flow and innate human associations vital to communicative design (Hyde, 2013).

The goal of Friedman’s exercise (Figure 5) was to have his students explore new visual possibilities, and grasp how a re-interpretation of graphic design elements could turn quantitative inputs into fresh, new qualitative outputs.



Figure 5
 Visual exploration that transforms quantitative input (weather data) into a qualitative output. Friedman, Dan. *Weather reports, Student project*, Yale University. 1970

3.2 Weather As Banal In Terms Of Lack Of Written Expressiveness

The Weather, a book by Kenneth Goldsmith (2005), highlights with extreme clarity how boring and banal weather content can be. Goldsmith’s book is a full transcript of one-minute weather reports broadcast by a New York City all-news station from December 21, 2002 to December 21, 2003. The idea of integrating a full year

of weather transcripts is a remarkably novel and provocative idea. However, by placing it in the form of continuous prose he allows the viewer/reader to see this admittedly boring and predictable content from a different and interesting new angle (Figure 6).

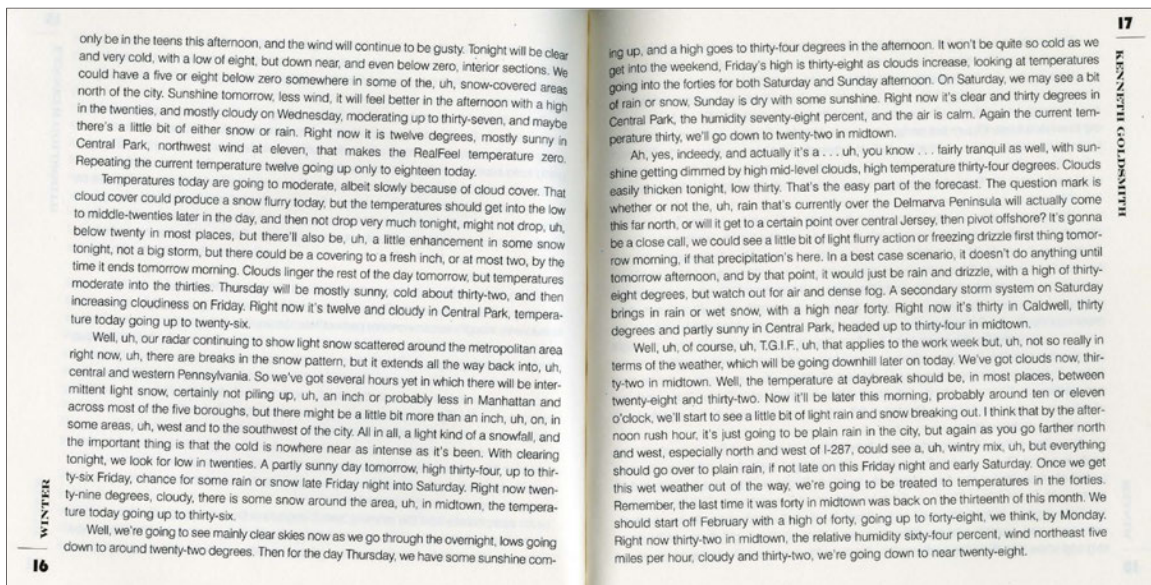


Figure 6

One year of weather reports translated into a book format, creating a reading experience that reveals the boring, monotone and repetitive nature of weather reports. Goldsmith, Kenneth. *The Weather*. Los Angeles: Make Now Press. 2005.

On a deeper level, Goldsmith's book features a duality between an approach that is original and interesting, and content that is repetitive, mundane and unimaginative because of the change from the radio broadcast (audio) to book (visual) format. According to the aforementioned Dr. Nealon: "Goldsmith did not attempt to invent new forms or liberate this banal information. Rather, his aim was to foreground the liberal banality of language usage" (Nealon, 2013, 120). In addition, Nealon insists that "the simple act of moving information from one place to another constitutes a significant cultural act in and of itself" (Nealon, 2013, 117).

Marjorie Perloff further claims that Goldsmith's achieved his goal of "radically re-familiarizing" weather data:

The neutral layout de-contextualizes the content, so that it loses the action and suspense that was initially part of the message, and intended by its producer. *The Weather* is therefore considered a work of radical de-familiarization. It forces the reader to think about weather in entirely new ways (Perloff, 2005, 11).

Despite changing the media from a radio broadcast to book format, the experience for the audience remains devoid of expression and emotional content. This is due to the book's mundane type setting and neutral, classic layout, which creates an uncreative and uninteresting continuous reading experience. This visual representation thus further emphasizes (and criticizes) the banality of weather data as presented in the broadcast media and its excessive visibility while taking banality to a whole new level. As such, my research was inspired by the idea of taking banal content from a weather report and moving it into new contexts (mediums).

However, unlike the approach of Goldsmiths in *The Weather* project, I avoided transferring repetitive, continuous and dull weather content into a similarly dull visual representation. Instead, my investigation is an attempt at providing various ways of breaking down weather data, emphasizing some aspects over others, thereby opening the door to new ways of reading this content.

4. Conceptual Art

My historical overview for this project begins with the conceptual art movement in the 1960s, which rejected the dominant conception of art practice that shaped the first half of the 20th century. More specifically, proponents of this movement rejected the notion that art practice necessarily relied on the creation of a physical end-product. Effectively, the Conceptual Art movement viewed art as something that was not exclusively defined by aesthetic properties, but also by concepts and ideas themselves. In this sense, “art was not only about forms or materials, but also about ideas and meanings; and as such, cannot be defined in terms of any medium or style” (Godfrey, 1998, 4). Also the term “art proposition” was used instead of artwork, because a conceptual work of art in the traditional sense is a contradiction in terms” (Kosuth, 1969). In other words, the Conceptual Art movement proposed that artistic emphasis should be on the concept itself, and not on the realization of the physical work (i.e. end product).

For example, the CardFile (Figure 7) project by artist American Robert Morris opened the door for what would be called the first “purely conceptual work of art” (Osborne, 2002, 68). “The concept is simple: 44 index cards contained in the file document the steps the artist followed in the conception and making of the work” (Wood, 2002, 26).



Figure 7

The Cardfile piece focuses purely on its conceptual aspect, as the artifact consists in a step-by-step guide to making the final artwork, which was never materialized by the artist. Morris, Robert, *CardFile*. 1962

In this work (Figure 7), the artist provides only the description of each step for its conception, which no longer need to be materialized. In his remarks to *Art Forum* magazine in 1967, the American artist Sol LeWitt supported this idea :

Conceptual Art, the idea or concept is the most important aspect of the work. The planning and decisions are made beforehand, and the execution is a perfunctory affair (Godfrey, 1998, 13).

Despite this assertion, Sol LeWitt did not want to associate with the aspect of the conceptual art movement that promoted only the concept, without requiring a visual artifact element. As Garrels points out, LeWitt “produced a large group of drawings

with his ingenious process of developing variations based on rules” (1978, 10) (Figures 8 & 9).

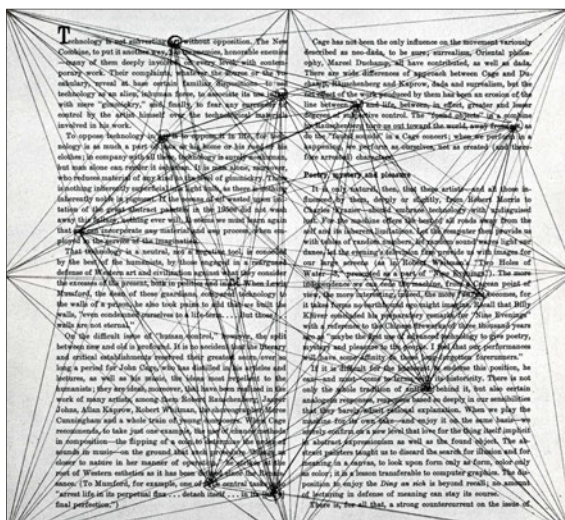


Figure 8
LeWitt painting with rules defined by the position of the word "Art", in an attempt to create a composition of lines. LeWitt, Sol. *From the word(s) "Art"*, 21.8cm x 22.8cm. 1972

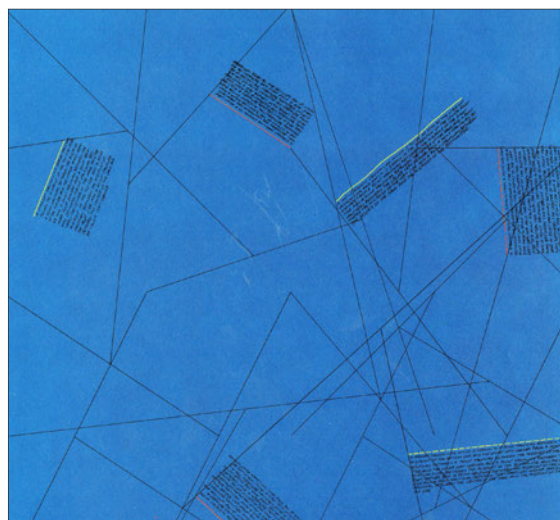


Figure 9
LeWitt painting with rules defined by orienting lines and colors. LeWitt, Sol. *The Location of Yellow and Red*. Straight, 35.6cm x 35.6cm. 1976

With the two projects above (Figures 8 & 9) Sol LeWitt demonstrated how an execution or process resulting from previously-defined rules and decisions relating to form and composition, could be used to provoke an interesting mental reflection for the artist, and for spectators (LeWitt, 1967, 80).

Despite his high profile in the Conceptual Art movement, LeWitt was not in total agreement with purists who focused exclusively on the “thinking” (Godfrey, 1998, 152). He believed that the process of creating was of equal importance to the concept. As Godfrey points out, LeWitt refused to believe that the existence of a “thing”, or just an idea can be a complete work itself. Rather, he believed that the idea and the art were

part of the same cycle (1998, 152). LeWitt felt that a process must follow its own path, and that it is possible for some results to emerge that the artist had not imagined.

In this light, rather than following a concept or set path, LeWitt opened the door to viewing artistic direction as suggested instructions, rather than as a set of rules that must be followed. This is evidenced in the instructions set out in his Four Color Drawing project (Figure 10):

Ten thousand random straight lines drawn by one draughtsman, 1000 lines a day, for ten days, within a 120" square. Lines, not short, not straight, crossing and touching, drawn at random, using four colours (yellow, black, red and blue). (Godfrey, 1998, 153).

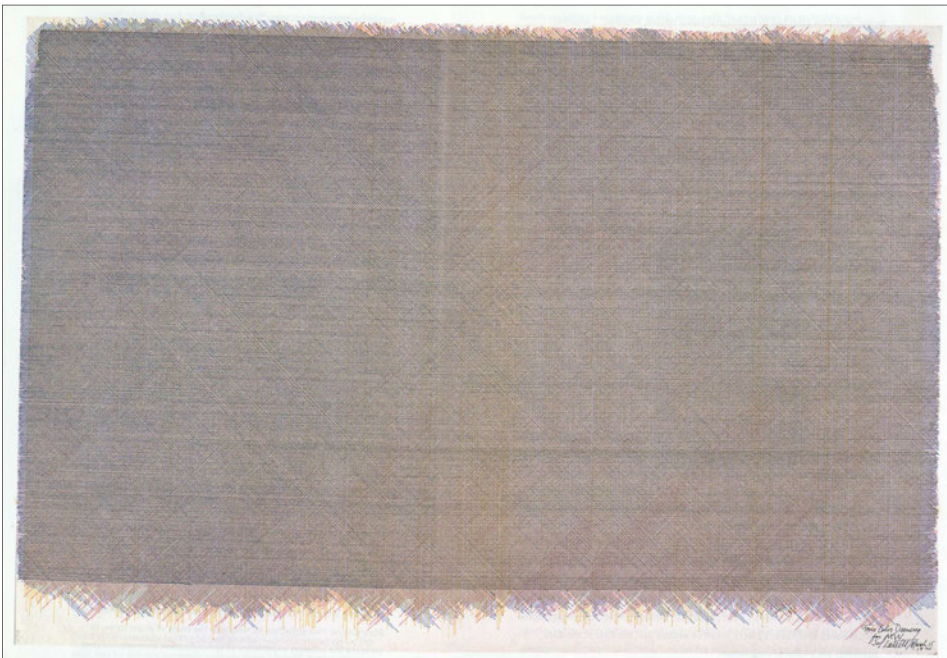


Figure 10

Drawing project executed following someone else's instructions. This piece prioritizes the conceptual aspect instead of the final artefact as the artist doesn't pre-determine or control the outcome of the making process. LeWitt, Sol. *Four Color Drawing*. 1970

Thus, the work of LeWitt demonstrates the possibility of using instructions combined with forms as a source for visual exploration. In the context of my research, LeWitt's philosophy is of interest because, compared to the purist idea of conceptual art which stated that the idea was the project itself, he believed that art was a combination of ideas, concepts and realizations. In other words, rather than leading to a limited set of solutions, conceptual constraints could inspire many potential solutions. In this sense, rules do not have to be viewed as a limiting element, but rather as a guideline to explore multiple variations.

As a basis for this research, I establish a connection between conceptual constraint-driven tactics and the Conceptual Art Movement. However, similar to LeWitt, I don't associate with the part of the movement that focuses on the concept itself while rejecting the need for the creation of a visual artifact. Rather, I establish a link between my exploration and the part of the movement that emphasizes the relationship between conceptual constraints, process, intuitive input from designers and, ultimately, visual artifact propositions.

5. Conditional Design

Conceived in 2008 by Luna Maurer, Edo Paulus, Jonathan Puckey, and Roel Wouters, Conditional Design focuses on a process defined by rules and conditions. According to the *Conditional Design Manifesto* (Maurer, Edo Paulus, et al., 2013), it is possible to introduce subjectivity and the experimentation within the execution of a project despite a structure established by rules and conditions.

Conditional design opts for an experiential process through executing conditions developed by collaboration and participation. In this respect, the aspect of exchange and discussion between participants becomes vital, because it is critical for solving and interpreting conceptual constraints. In other words: the interpretation of the rule is the product itself.

Through conditional design, participants do not have preconceived ideas of what might result visually from the process. This is the core value of this approach, because participants do not have to evaluate the visual exploration in order to see if their specific requirements are met or their problems resolved.

In Conditional Design: Workbook (Blauvelt, Koert Van Mensvoort, 2013, 11), Luna Maurer, Edo Paulus, Jonathan Puckey and Roel Wouters developed a series of drawing exercises that can be performed alone or in groups (Figure 11).

There is no right or wrong visual answer. The goal is to let creativity flow according by how rules are interpreted. It is, therefore, fundamentally an organic process.

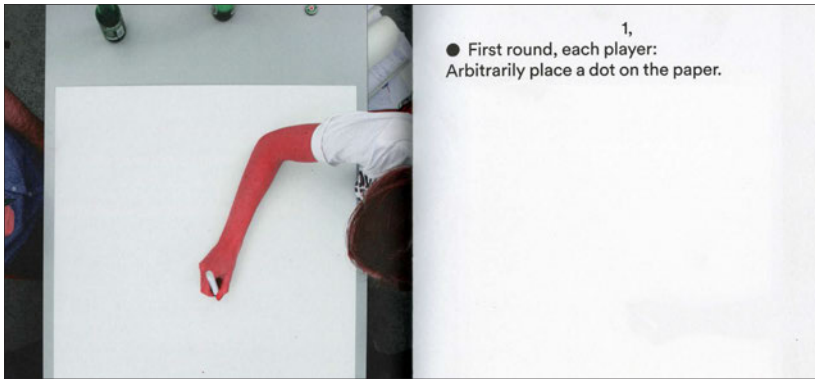


Figure 11

Participants can subjectively decide where they want to draw a circle on the surface.

Blauvelt, Koert Van Mensvoort. *Conditional Design: Workbook*. 2013

Conditional Design is an experimental, personal and subjective approach to conceptual constraints and rules. As such, in order to advance research inside this movement, it is rarely used with specific or real content. The mission is to see the interpretation of conceptual constraints as a personal or participatory challenge. Similarly to the conceptual art movement, the process itself is the project. It is important to note that my research did not specifically use conditional design as a method for generating visual artifact since I was looking for to generate visual outcomes that displayed specific characteristics.

However, my research is based on a similar perception of conceptual constraints as they are not considered limiting, but are rather seen as a starting point for investigation and an essentially freeing device since they allow for subjective and creative interpretations, as well as unexpected visual outcomes.

6. Generative Design

Generative Design is defined as a methodology used to produce visual and animated outputs from rules that are derived from computer programming. Celestino Soddu, an architect and professor at Politecnico di Milano university in Italy, is one of the pioneers of generative design and believes that the approach can generate unique and un-repeatable results performed by an idea-code (Soddu,1994). The code can take the form of various programming languages such as *Processing*, *Quartz Composer*, etc.

In the context of this research, I am experimenting with Generative Design through the use of the open-source *Processing* language, which was greatly democratized by Casey Reas and Ben Fry through their work and various publications. Their goal was to facilitate the learning of visual programming inside an educational context:

The goal was to make a language for teaching design and art students how to program and to give more technical students an easier way to work with graphics. The combination is a positive departure from the way programming is usually taught. We begin by focusing on graphics and interaction rather than on data structures and text console output (C. Reas and Ben Fry, 2010, Preface).

The image below (Figure 12) illustrates how a square manifests through Processing-based coding:

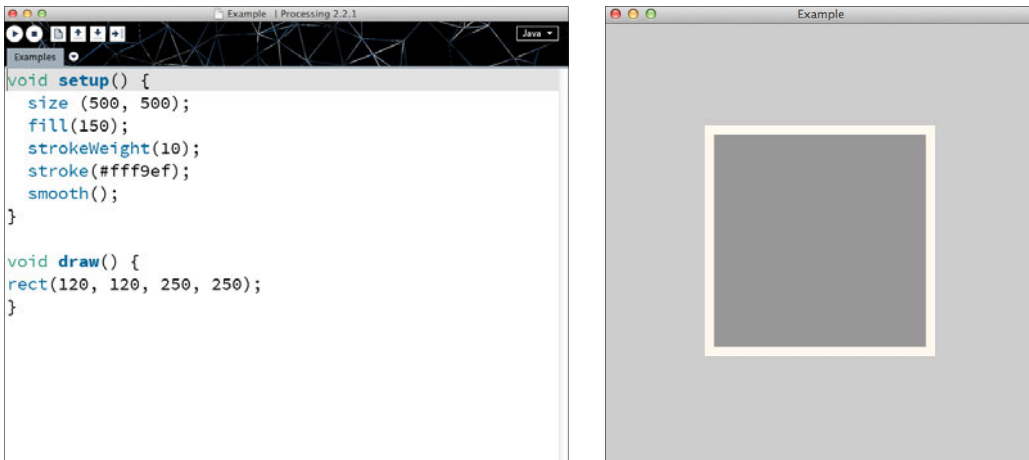


Figure 12

Example of a square realized with *Processing*. Jean, Philippe. 2015

Also, Generative Design can be used within the context of a professional practice. The Onformative studio based in Berlin, Germany develops solutions through generative design (Figure 13). The company's philosophy is to establish a bridge between the experimental exploration of generative design, and its application in the marketplace.



Figure 13

An abstract data visualization created with *Processing* illustrates the Facebook communication of the Berlin Telekom. Onformative. 2013

Processing was useful to my research and exploration, because it allowed me to efficiently evaluate the impact of the application of a Generative Design methodology inside the design process. Specifically, it enabled me to explore how automation impacts – both positively and negatively – the design process in the context of a thesis project.

7. First Principles In Graphic Design And Conceptual Constraints

In the book *Graphic Design: The New Basics*, Ellen Lupton and Jennifer Cole Phillips describe first principles (Figure 14) in the context of graphic design as a method for framing problems. They also suggest that experimenting with and examining visual forms by isolate elements or limiting variables within a graphic design context can lead to the development of a visual language that is engaging, communicative, persuasive, and designed to draw attention to dynamic, living content (2008, 10). As such, these principles can be viewed as formal factors that influence the design process and contribute to a result. I integrated first principles in my thesis as a general approach to explore and drive various possibilities throughout my research.

| Principles of Graphic Design | | | |
|------------------------------|--------------------|-----------------|----------------------|
| Point,Line, Plane | Rhythm and Balance | Scale | Texture |
| Color | Figure/Ground | Framing | Hierarchy |
| Layers | Transparency | Modularity | Grid |
| Pattern | Diagram | Time and Motion | Rules and Randomness |

Figure 14

List of Principles of Design Analysis explained by Ellen Lupton and Jennifer Cole Phillips. Ellen and Jennifer Cole Phillips. *Graphic Design: The New Basics*. New York : Princeton Architectural Press. 2008

In this study, I drew from the formal principles of graphic design: rhythm and balance, scaling, color, framing, layers, hierarchy, grid, plan, rules, and randomness as

ways to manipulate quantitative information into something visually more enticing and engaging. These principles, combined with selected conceptual constraints, allowed me to enrich the visual experience of this content, and thus invite readers to enjoy a richer and more meaningful experience.

The term constraint can be defined in multiple ways, and as such it is important to note that my research did not examine constraints in a business context (e.g. time constraint, budget constraint, customer requirements, etc.). Rather I viewed constraints as formal factors that influence the design process and contribute to a result.

As explained in the literature review on page 17, for the purpose of this research, I used constraints in a conceptual way, similar to the approach of the American artist Sol Lewitt. Specifically, I share the philosophy of Lewitt, who firmly believed in the integration of conceptual constraints within a creative process (which in my case was a design process) to ultimately generate several visual propositions, and I used this philosophy as the basis for my investigation.

I combined the use of conceptual constraints and various first principles within my design process, in order to emphasize specific elements of meteorological content, and ultimately alter the way we perceive and read this content.

I view these first principles as positive, systematic framing to sharpen my perspective on the design process and stimulate play. Rather than suppressing creativity, using first principles in combination with conceptual constraints is a means by which to extend boundaries and push the creative envelope in the graphic design discipline. Ideally, this combination may even create new and exciting methods of working within the design process, because, when used properly, both the first

principles and conceptual constraints might steer me away from obvious solutions and allow for an in-depth investigation to help me overcome personal boundaries and routine solutions.

8. Creative Operations

In order to generate a variety of rich visual explorations and methodologies, each research project was developed within a specific "creative operation". John S. Gero, a research professor in the Department of Computer Science and the School of Architecture at the University of North Carolina, specializes in cognitive studies of computing behavior. Together with Michael A. Rosenman researcher at the Key Centre of Design Computing, Department of Architectural and Design Science, University of Sydney, they proposed four models of creative design (Figure 15) that derived from computer modeling: combination, mutation, analogy and first principles (Gero and M L Haher, 1993). Gero further added a fifth model of creative design, which he dubbed "emergence" (Gero, 1994).

From a computer modeling perspective, John S. Gero asserts (Gero, 1994, 9) that these models of creative design give rise to engaging concepts for design researchers for three reasons:

- they provide a framework in which to explore ideas about design;
- they provide a schema to model human designing; and
- they allow for the development of tools for human designers.

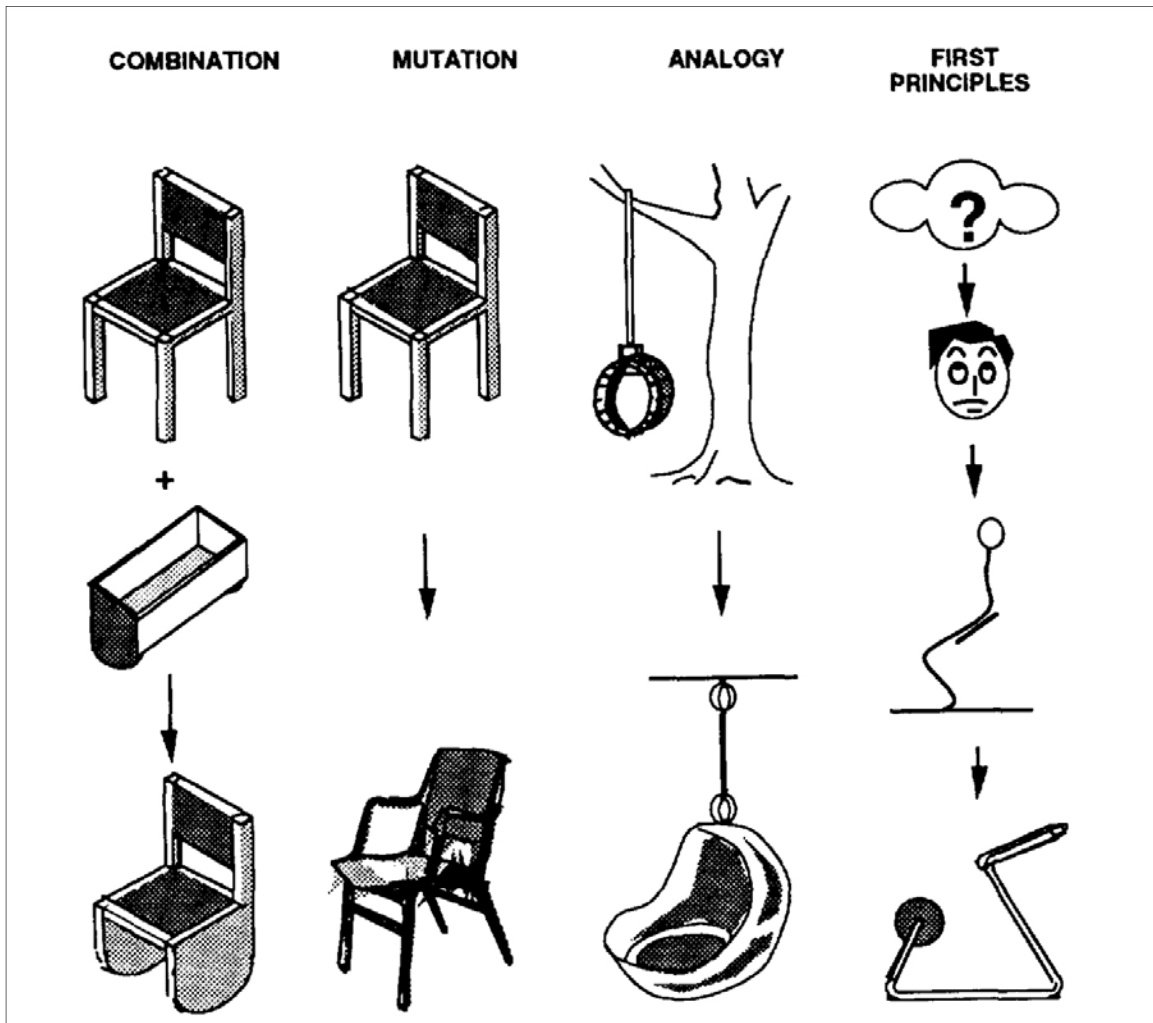


Figure 15

Demonstrations of the results of the procedures of combination, mutation and analogy, design from first principles and emergence from Rosenman and Gero in Cross, Nigel. Descriptive models of creative design: application to an example. *Design Studies*, 18(4) pp (1997). 433

Nigel Cross, a specialist in design methods and architecture, supports these models as a means to “promote creative thinking in design” (Cross, 1997, 432).

This philosophy has been developed further in Cross’ article entitled Descriptive Models of Creative Design (1997), which proposes five models in the context of product design process.

It is also important to mention that according to some specialists and teachers, the term is variously referred to as procedures, models of creative design, or creative design processes. In the context of this research, I used the term "creative operations" when I refer to analogy, combination and mutation, and first principles. Each "creative operation" contains specific characteristics :

Combination

Creative design by combination occurs by combining features from existing designs into a new combination or configuration (Cross, 1997, 433).

Mutation

Creative design by mutation involves modifying the form of some particular features, of an existing design (Cross, 1997, 435).

Analogy

Creative design by analogy is defined as the product of processes in which specific coherent aspects of the conceptual structure of one problem or domain are matched with and transferred to another problem or domain. (Gero, 1994, 16).

First Principles

Creative design using first principles involves generating forms or structures based on pre-defined requirements. It is often described as a way to generate "good/or creative designs" (Cross, 1997, 437). In the context of graphic design, these pre-defined requirements, or guides for creation, can easily be associated with the principles of graphic design

listed by Lupton and Phillips—scale, hierarchy, framing, grid, etc. (Lupton and Phillips, 2008, 10).

My investigation was shaped by three "creative operations": combination, analogy, and mutation (Figure 16). As stated by Gero: "these three specific operations allow for exploration to start from existing elements – either in the domain or outside of it – which could then be modified to produce elements that did not exist before" (Gero S., Mary Lou Maher, 1993). These operations were relevant for this research given that existing content (weather data) was used as the basis for creation.

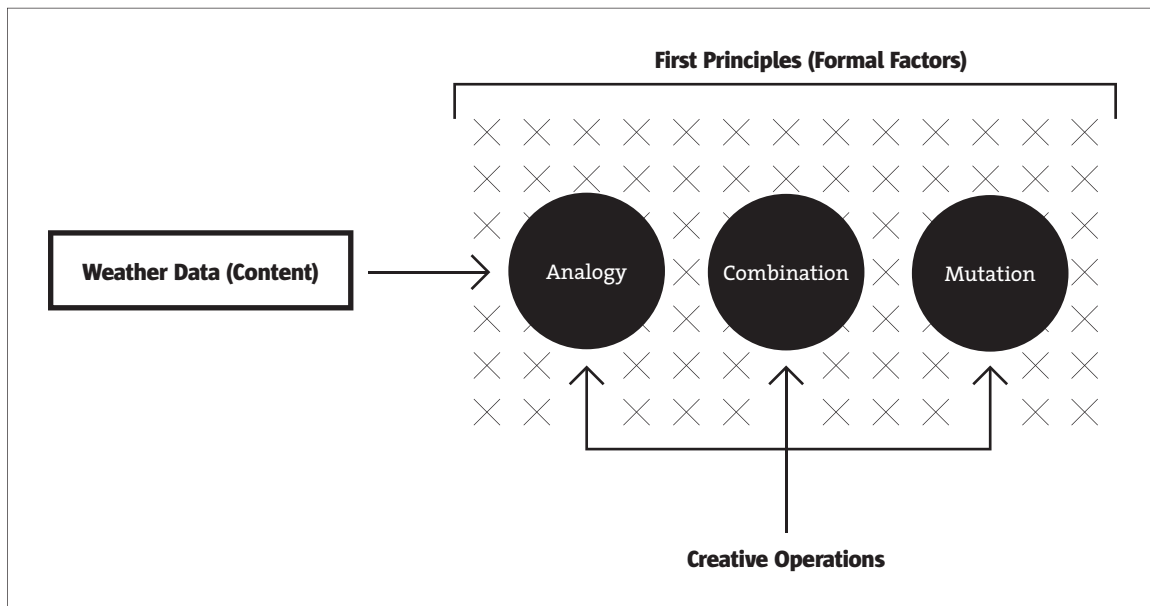


Figure 16
Investigation of thesis subject through three "creative operations".
Jean, Philippe. 2015

My decision to use these "creative operations" was based on the fact that they facilitate the creation of an engaging and persuasive visual communication, break

the routines present in traditional design process, push the boundaries of creation, and enable the exploration of alternative methods for creation, which generates new visual possibilities; characteristics that were vital to each step of my exploration. As for first principles, rather than using it as a specific operation in my research, I opted for its integration as a general approach to explore and drive various possibilities throughout my thesis, in combination with the three "creative operations" that shaped my investigation.

Visual exploration with these "creative operations" inspired the question: what circumstances should be considered significant when introducing conceptual constraints into the process of design? John S. Gero and Bimal Kumar, believe that the presence of variables within the process of design is valuable. They believe that the introduction of new variables is beneficial when :

- routine design procedures do not yield any design solutions;
- optimization procedures indicate there are no feasible solutions; and
- the designer or user desires better or different designs (Gero, JS and Kumar, B, 1993, 211).

Thus, I investigated the impact of rules and conceptual constraints, as well as the advantages of using rules and conceptual constraints as a protocol (i.e. what they can and cannot offer). My approach was also an exercise in critical and conceptual thinking, as well as part of the development of a methodology that could function both as a framework for visual exploration and as an approach for conducting research in the context of graphic design.

9. Process Of Design

As described above, all of these "creative operations" allowed me to systematically orchestrate an outcome. This was accomplished by defining a repeatable design process as proposed by Nigel Cross.

This process consists of three stages (Figure 17): the collection and classification of information necessary to frame a specific design problem, and the definition of conceptual constraints and criterias for success (analysis), the formulation of visual propositions (synthesis), and the evaluation of visual proposals according to the criterias established in the analysis stage (evaluation) (1984, 84).

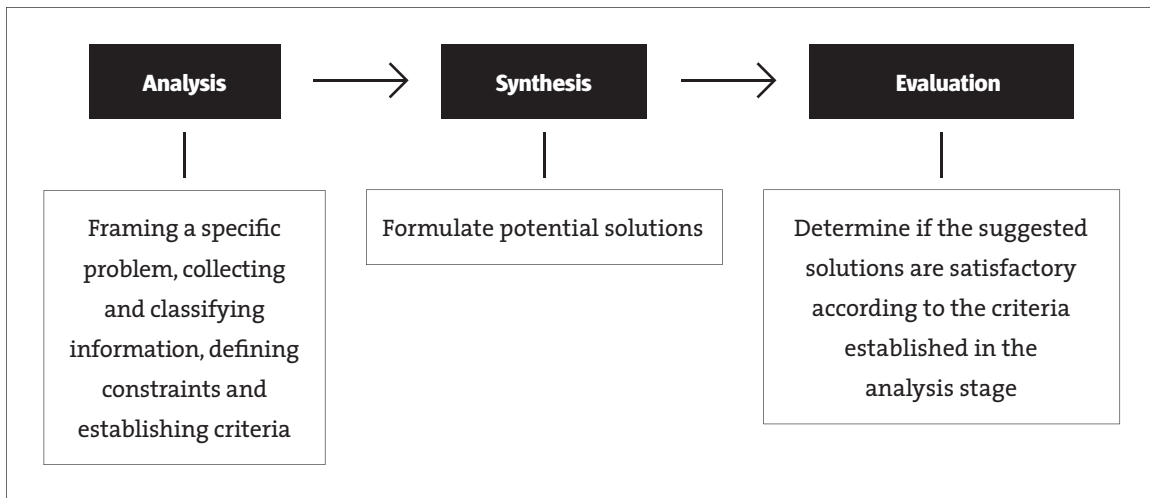


Figure 17

The Design Process explained by Nigel Cross *Developments in design methodology*, 86. 1984

My decision to use Cross' process of design was based on the fact that he describes it as "the translation of information in the form of requirements, constraints and experience into potential solutions, which are considered by the designer to meet

required performance characteristics” (Cross, 1984, 84), a definition of constraints that is close to the premise of my investigation. Additionally, the application of Cross' process of design allowed me to explore each operation (analogy, combination and mutation) in a systematic and consistent manner:

Analysis stage

Nigel Cross defines the analysis stage as “the collection and classification of all relevant information relating to the design problems on hand” (Cross, 1984, 85). In the context of this research, the analysis stage consisted of framing specific issues related to day to day representation of weather content in relation to my definition of banal information (lacks written expressiveness, an overabundance of data available, and its context and visual structure are neutral and conventional). As such, I collected and classified meteorological content related to these problems, I established criteria for visualizing them, I decided which operations (analogy, mutation or combination) the investigation would use and I ultimately decided which conceptual constraints would guide the synthesis stage.

Synthesis

According to Nigel Cross the analysis stage as “the formulation of potential design solutions to parts of the problem, which are feasible when judged against the information contained in the analysis stage”. (Cross, 1984, 85). In the context of this research, this stage consisted in the creation of visual propositions based on the conceptual constraints

and specific operations established in the analysis stage.

Evaluation

Nigel Cross describes the evaluation stage as “the attempt to judge by use of some criterion or criteria which of the feasible solutions is the one most satisfactorily answering the problem” (Cross, 1984, 85). In the context of this research, this stage consisted in the observation and evaluation of the visual propositions for weather data representation developed in the synthesis stage according to the criteria set in the analysis stage. At this point, I also evaluated the relationship between the "creative operations" and the design process.

From an investigation point of view, the consistent relationship between the three "creative operations" and the design process enabled the entire framework to be clearly documented. Furthermore, it allowed for each project to be evaluated and compared, and for conclusions to be drawn from that analysis.

These evaluations occurred at each stage of the design process and provided insights on whether a project was progressing successfully or not. I could therefore make adjustments in order to resolve problems and improve quality. As such, they allowed me to work in cycles that oscillated between imaginative creativity, and pragmatic correction. This iterative approach to making was vital because it enabled me to generate a wide variety of visual propositions.

10. Combination As A Creative Operation For Design Exploration

Combination is a model (operation) that posits “creative design can occur by combining features from existing designs into a new combination or configuration” (Cross, 1997, 433). This operation is used for “making,” and allows for the investigation of layout possibilities with a set of elements in a pre-established space.

There are many examples of the application of the combination operation in the graphic design discipline. For example, Edouard Pecher, a graphic designer, who earned an MA in Graphic Branding and Identity at the London College of Communication. In his branding exploration, Pecher used a generative design approach to create the visual identity of a theater in Belgium (Figure 18). Pecher described his approach as “rules based upon contrasting elements of squares, triangles and circles, colors and lines” (Noble and Bestley, 2011, 45). Thus, all of his combinations (permutations) generated a wide variety of possible compositions.

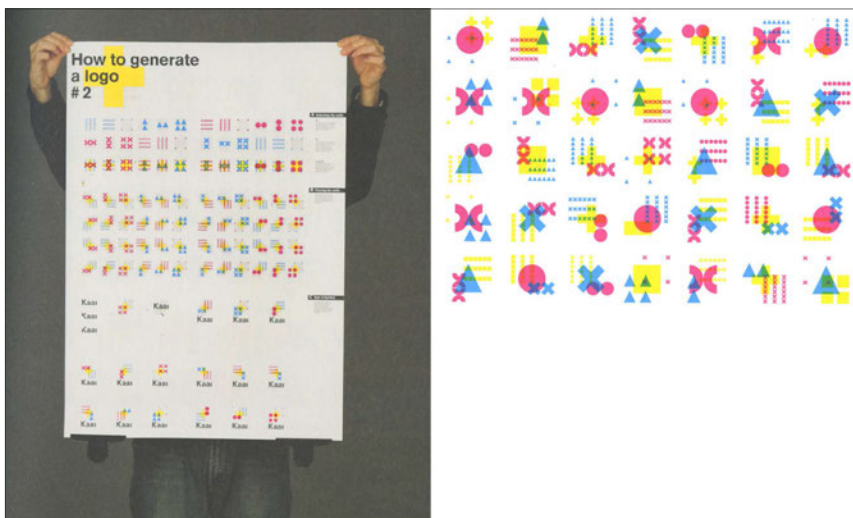


Figure 18

Variations of visual combination with generative design methodology for a theatre identity. Pecher, Edouard. *The System Maintains*. 2011

10.1 Wednesday, A Mix Of Sun And Cloud, High 22

In this project, *I examined how generative design through a combination operation could be used to liberate banal information from its lack of written expressiveness (i.e. dull text).*

Thus, I extracted three items (Figure 19) from the weather forecast published by *Environment Canada's website* on Monday, September 29th at 3:00pm for the predicted conditions of Toronto's Pearson Airport for Wednesday October 1, 2015:

- Icon: Sun & Cloud High 22 (Visual)
- Sentence: "A mix of sun and cloud" (Textual)
- Day of the week : Friday (Temporal)

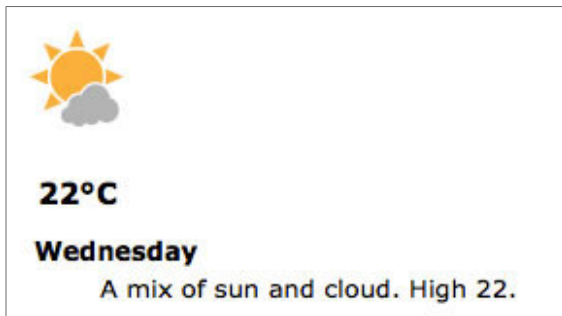


Figure 19

Weather forecast for Wednesday October 1 Issued Monday September 29th at 15h from Pearson Airport provided by the *Environment Canada Website*, accessed September 29, 2014. <http://goo.gl/WrTTr9>

I selected and collected this specific content, because I consider these three items as banal in the sense that they are anchored in our daily lives and in our everyday speech (Nealon, 2013, 109). While they convey important information, they are nevertheless emotionless, uncreative and comprised of words and icons that are frequently repeated (e.g. day of the week, temperature, short descriptive phrase).

10.1.1 Analysis

As mentioned earlier, this project was framed around the issue of the lack of written expressiveness of weather data representation. More precisely, I was looking to produce an engaging and original way of presenting the three selected weather data items. As such, my criteria for success was articulated around whether a visual proposition had the necessary visual characteristics to be considered expressive and produce an original reading experience for the reader. Thus, for this project, the analysis stage was extremely important because this was where I configured and set up the generative design method with *Processing*. I selected *Processing* because it allowed me to push the mathematical limits of combination via automation, by generating all visual possible permutations (i.e. combinations) based on preset parameters. Additionally, it is in the analysis stage that I defined the parameters that would govern the project's procedure and conceptual constraints.

First, I changed the visual appearance of the three items chosen in order to enhance their formal expression and distinguish one element from another (Figure 20).



Figure 20

Visual adaptation for the three extracted weather items for the generative design combinations. Philippe Jean. 2015

Next, I defined how the visual creation process would be executed in the synthesis stage by creating a square space environment that was 600 pixels wide by 600 pixels high. I further divided this square into nine equal areas of 200 pixels wide by 200 pixels high. To avoid overlapping elements in the same location, the script was set to only allow one element per space (Figure 21).

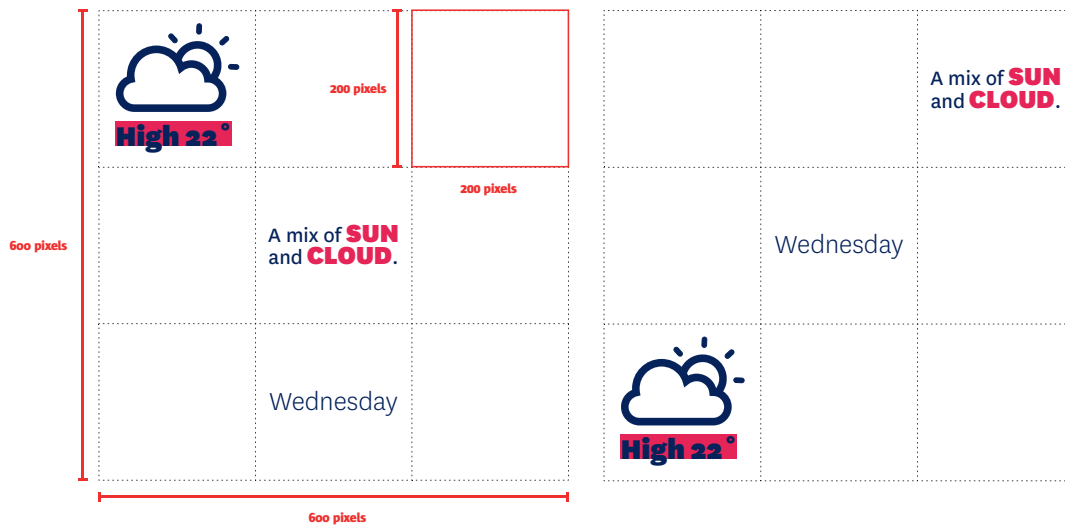


Figure 21
 Configuration and condition for avoid overlapping elements in the same location. Jean, Philippe. 2015

In order to enhance and increase visual contrast between the three elements, I added a scaling function: small, medium and large. It is important to mention that this dimension was a matter of proportion (percentage), and not in term of pixels size. This proportion was applied in accordance with the size of the subspace. Thus, the small size was 50% of the initial 200px by 200px spacing, which led to a dimension of 100px by 100px. The medium size maintained the initial dimension of 200px by 200px.

The large size was 300% bigger than the subspace, for a size of 600 pixels by 600 pixels (Figure 22).

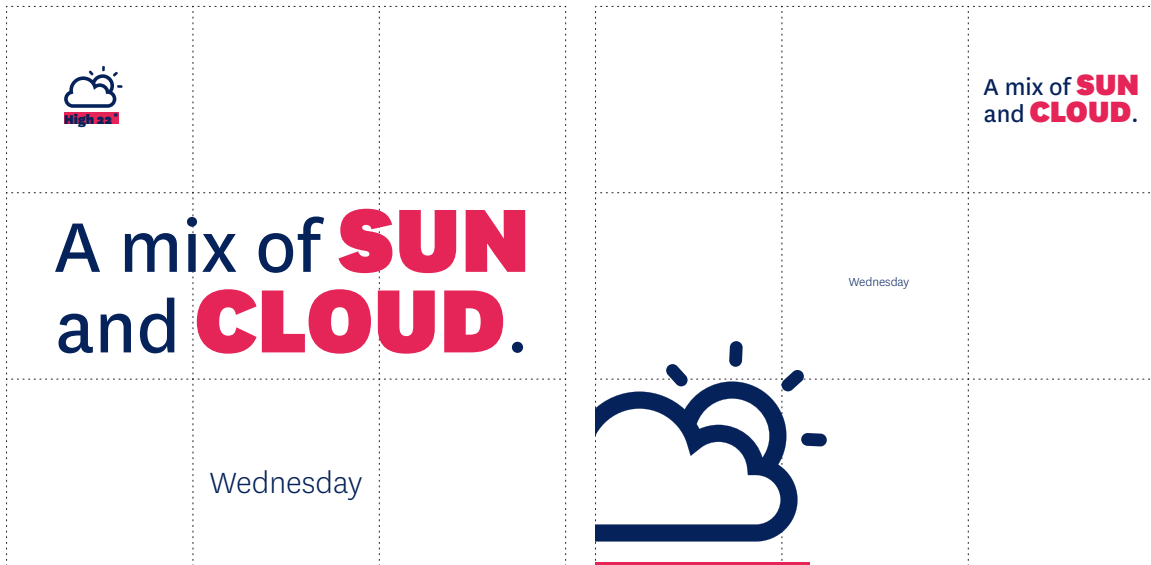


Figure 22

Left Square: Icon (Small), Sentence (Large), Day of the week (Medium);
Right Square: Icon (Large), Sentence (Small), Day of the week (Medium).
Jean, Philippe. 2015

In addition, unlike the distribution of the elements in the space, it was possible to use multiples of the dimensions inside a specific proposition: large, medium, medium; small, small, small; and large, medium, small.

10.1.2 Synthesis

In this project, the synthesis stage was not as critical as the other stages, because the process was automated and I was not creating all of the visual combinations manually.

Yet, despite the use of *Processing*, there were some meaningful design choices to make. For example, I had to confirm that I was satisfied with the initial configuration and parameters before initiating the processing phase (Figure 23).

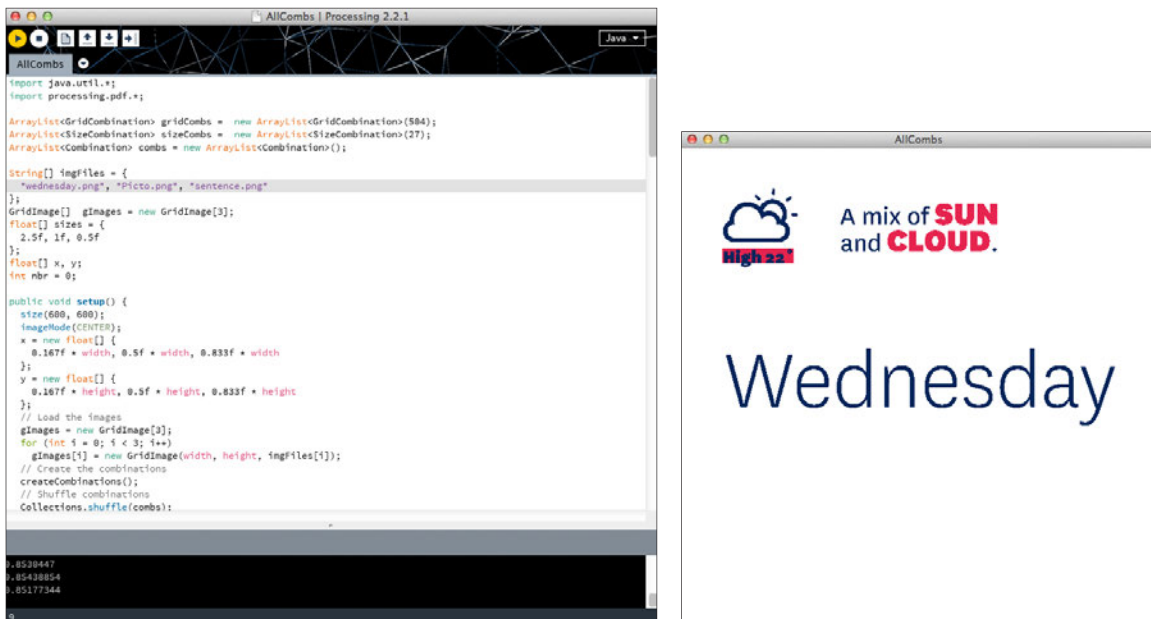


Figure 23

Script running during the generation of all the combinations according to the rules originally established in the analysis stage. Jean, Philippe. 2015

Overall, the synthesis stage was efficient, since I was not involved in the development process. I was therefore able to defer control to an external factor (*Processing*), and focus my efforts and energies on adjusting rules to see how they impacted the output.

Once satisfied with the configuration of the parameters, in just four hours and two minutes, this generative design approach together with *Processing* led to the creation of 13,608 different compositions (Figure 24).



Figure 24

6 of 13,608 automated compositions, *Wednesday, A mix of Sun and Cloud, High 22*. Jean, Philippe. 2015

10.1.3 Evaluation

My first set of observations was that the analysis stage was the most critical, because it enabled me to define the parameters and rules in order to generate all of the possible combinations. The second most important stage was evaluation, because it allowed me to check and see if I was comfortable with the visual outputs (which were set in the analysis stage). The synthesis stage was essentially meaningless for me, because I deferred control to *Processing*. I was a spectator, as processing took over and generated 13,608 different compositions.

My second set of observations was that combining the combination operation with *Processing* triggered the question of quantity generated versus quality. As mentioned, I did not believe that all of the propositions were a complete success. Yet, it is important to recognize that this method indeed opened the door to some compelling and unexpected creations that would otherwise not have been discovered. There were some disadvantages to the method. Since I was not involved in the synthesis process, I was not always in total control. As such, I could not make adjustments (small or large) to the process itself while it was ongoing.

Processing generates multiple propositions – both good and bad – which empowers designers to act as curators and make decisions regarding which proposition is relevant to their goals. Out of 13,608 compositions, 2,257 outputs were successful (Figure 25), and 11,351 were unsuccessful (Figure 26) in terms of their capacity to stimulate an original reading experience.



Figure 25

Three examples of automated outputs that were deemed successful according to the established criteria. Jean, Philippe. 2015



Figure 26

Three examples of automated outputs that were deemed unsuccessful according to the established criteria. Jean, Philippe. 2015

An output was deemed successful if the layout allowed enough readability for the content to be informative, while proposing a visual structure that either altered the usual reading order or allowed alternative meanings to emerge by proposing an unusual hierarchy, and dynamism and movement in the composition. Those two criteria were established based on Ellen Lupton and Jennifer Cole Phillips' (2008) description of how these graphic design principles impact the reader's experience (Figure 27).

Criteria to determine whether an output was succesful in generating an original reading experience

Unusual hierarchy

Visual hierarchy controls the delivery and impact of the message by establishing a clear reading order (Lupton, 2008, 115). As such, an unusual hierarchy can ultimately promote an original reading experience if it changes the way specific elements are perceived and the order in which they are read.

A composition was deemed to have an unusual hierarchy if it proposed an unexpected reading order and challenged the perceived importance of specific items from the content (ie if the scaling of the elements of the composition put the emphasis on specific items not traditionally brought forward).

Movement and dynamism in the composition

“Graphic Designers use balance and rhythm to create visuals that pulse with life, achieving both stability and surprise” (Lupton, 2008, 29). Dynamism and movement can thus ultimately promote an original reading experience as intense contrasts in scale and dynamic positioning can generate an effect of surprise while reading. Additionally, cropping can participate in enhancing this reading experience by allowing the reader to discover specific aspects of the elements of the composition that would traditionally go unnoticed (Lupton, 103).

As such, a composition was deemed succesful if it proposed a strong, rhythmic composition—through the use of scaling and positioning—, as well as unusual cropping that affected the reading experience by generating both surprise in the reading rhythm and an alternative understanding of specific elements.

Figure 27

Criteria based on first principles notions used to determine whether an output was succesful in generating an original reading experience. Jean, Philippe. 2015

In order to show the difference between an automated approach to making and a manual one in the context of a design process, I determined that the most efficient and practical way to display the results of this project was to implement a "human versus machine" challenge.

This experiment was conducted by comparing the different visual propositions that could be accomplished by automation in four hours and two minutes (13 608), and what I (i.e. a human being) could accomplish in the same time (129) (Figures 28 and 29) .

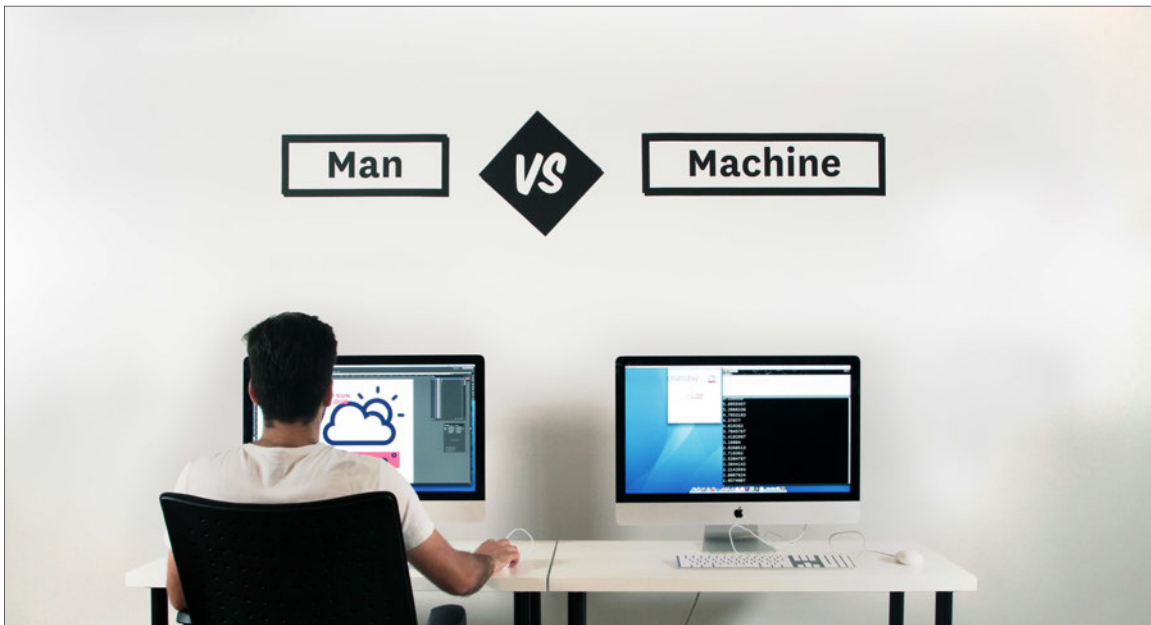


Figure 28

Workstation used for the confrontation between me (Man), and a computer (Machine). Jean, Philippe. 2015

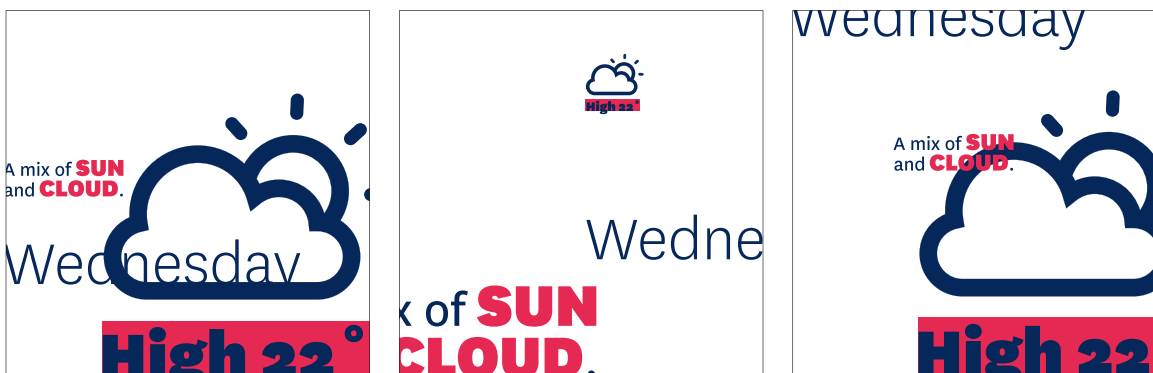


Figure 29

3 of 129 visual propositions generated manually. Jean, Philippe. 2015

Obviously, it is virtually impossible for a human being to produce the same number of compositions as a computer in the same amount of time. However, once the man-made visual propositions were analyzed using the criteria defined earlier, I observed that 111 compositions were successful and 18 were unsuccessful. It was apparent that there was a higher proportion of successful to unsuccessful compositions produced manually (8.5 out of 10) than through automation (1.7 out of 10). This can be explained by the fact that I was able to analyze and apply critical evaluations and judgment during the design process.

In my view, a good designer is one who can generate visual possibilities, yet is still involved in the process and can make intelligent decisions. In this way, my project demonstrated that automation does not necessarily have to diminish the role or input of designers. Rather, it can inspire designers to further refine and develop their decision-making abilities, and improve how they combine variables to achieve engaging and expressive visual propositions; some of which may be expected, and some that may be unexpected, yet exciting, different, new and creative.

11. Analogy As Creative Operation For Design Exploration

In *This Means This, This Means That* (2007) Sean Hall, the deputy head and leader in contextual studies in the Department of Design at Goldsmiths College, University of London, defines an analogy as a way of expressing meaning that helps us map one set of meaning onto another by making connections that are more or less obvious between two distinct elements (Hall, Sean. 2012,11).

An example of graphic design that uses analogy is the Polish contemporary artist Michal Batory in his cultural posters. An excerpt from the book *Michal Batory, Posters & Graphic Works* (2004) vividly demonstrates his mastery of this approach (Figure 30, 31).



Figure 30
Human foot shape made with rice to represent the Chinese culture. Batory, Michal. *Danse de Taipei à l'Afrique*. 2002

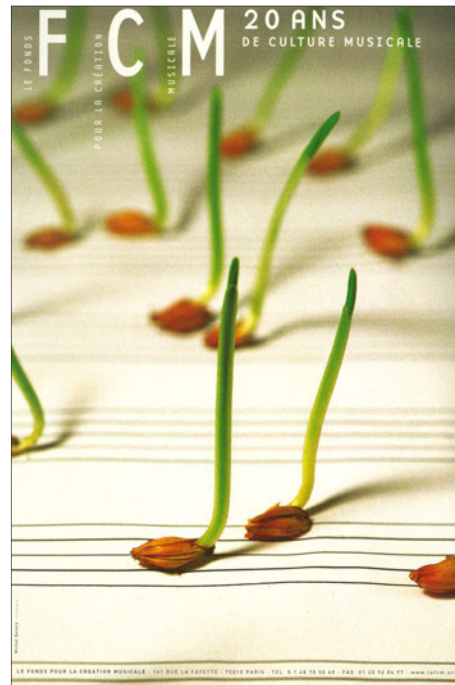


Figure 31
Germinated seeds aligned into a musical partition to represent emerging musicians. Batory, Michal. *Festival de Marne*. 2004

The poster on the left (Figure 30) uses a human foot shape made with rice to represent the Chinese culture in a poster advertising a dance event to which various countries participate. The poster on the right (Figure 31) uses germinated seeds aligned into a musical partition to represent emerging musicians in a visual campaign celebrating 20 years of visibility for their young musical talents.

The examples above show how a single analogy can create unexpected connections between elements that do not appear as connected at first sight. Used as an operation for making, analogy opens up a space for investigation into how two elements that are not of the same nature should be treated in order to strengthen each other's meaning. In the context of my research, it seems appropriate to use analogy to liberate weather data from its traditional perception as banal, since making creative and imaginative connections with other elements from our everyday lives can bring forward some of its forgotten qualities and ultimately enhance its perceived value.

11.1 Weather Yearbook

In this project, I explored *how analogy could be used as a creative operation within the design process to liberate banal information from its perception as uninteresting and its traditional unexpressive representation.*

11.1.1 Analysis

The *Weather Yearbook* is a full visual transcript of weather forecasts for Toronto's Buttonville Airport during 2014. I selected this content because it offered a wealth of weather information recorded on a daily basis over an entire year.

The numerical data that was captured in the yearbook included total precipitation (rain, snow) and sky conditions. I selected this data because I considered that the weather precipitation content (sky condition combined with snow and rain) could be effectively translated into a simple visual language using a gradation system. More importantly, from a conceptual perspective, I further determined that this qualitative data was conducive for storytelling and the creation of a visual sequence; specifically a book format, which would have a starting point (January 1, 2014) and an ending point (December 31, 2014). As such, the project was articulated around solving the issue of the uninteresting perception of weather content and the unexpressive nature of its visual representation. Effectively, I established that producing a narrative structure would help in liberating the content from preconceived ideas of weather data as it leaves place for the imagination of the reader. The visuals were thus evaluated according to their ability to transfer quantitative information into something qualitative through visual storytelling.

11.1.2 Synthesis

The synthesis stage was critical to the project, because it allowed me to create rules and conceptual constraints while actively participating in the process. In other words, I was both the designer and the rule-maker at the same time, because the rules were changing as I was observing the visual output, and could therefore change the rules to achieve desired outcomes.

As such, I felt that rules were not obstacles, but rather part of the process of design. They empowered my sense of control, rather than diminished it. This experience demonstrated a dynamic interrelationship between visual design and rules.

First, I designed a system based on the analogy between sky conditions and color gradients to visually represent the content. Depending on the forecast, I listed seven sky conditions (snow, rain, cloudy, mostly cloudy, mainly clear, clear and fog) and associated each of them with a specific color gradient (Figure 32).

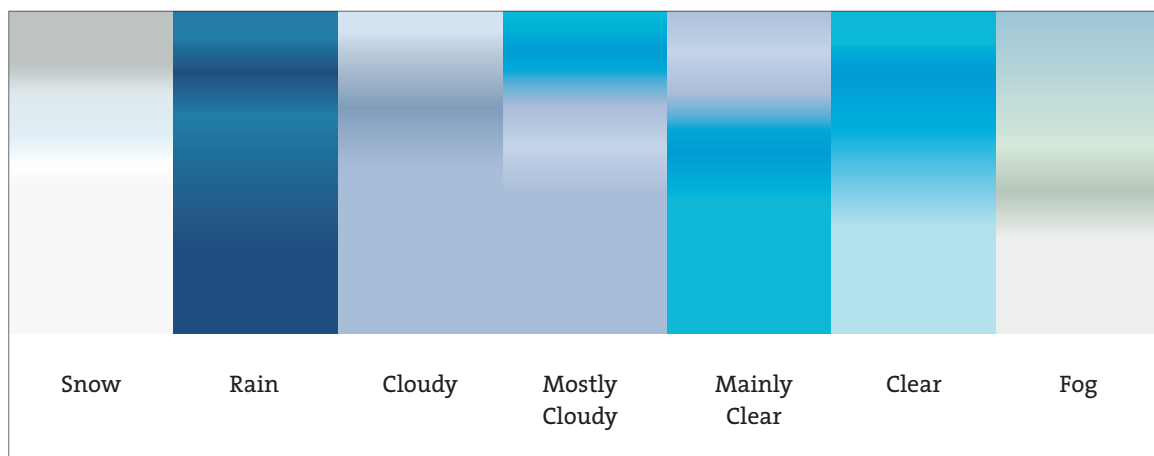


Figure 32

Sky Condition Analogy : snow, rain, cloudy, mostly cloudy, mainly clear, clear and fog. Jean, Philippe. 2015

As such, each page of the book was associated with a specific day, and illustrated by the colour gradient that covered the full background of each page.

Then, to complement the color system, I also developed a set icons to depict four categories of daily precipitation: rain, rain mixed with snow, snow, and snow mixed with rain (Figure 33).

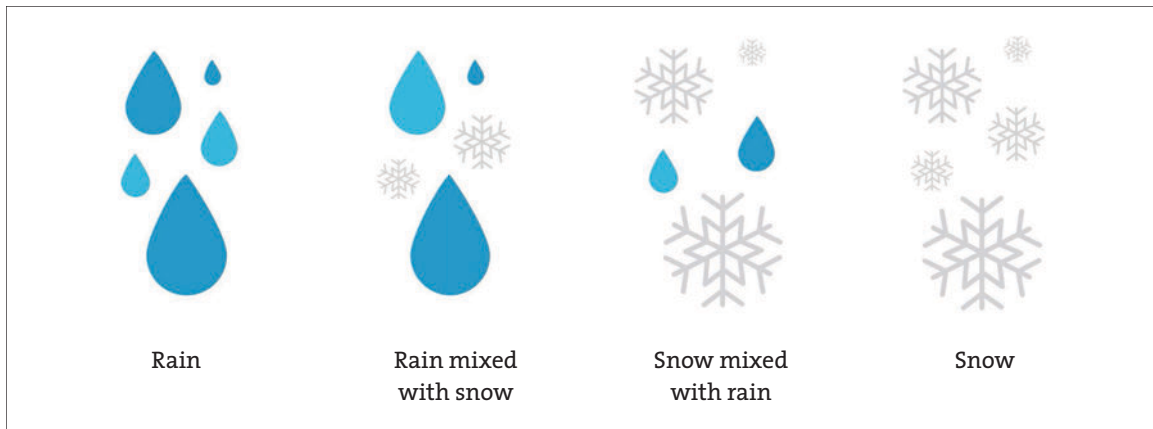


Figure 33

Visual icons : rain, rain mixed with snow, snow mix with rain and snow.

Jean, Philippe. 2015

However, unlike the condition of the sky, the icons representing precipitation did not cover the entire page background. Rather, only a portion of the page was used (left and right side). This decision was based on a desire to achieve a visual balance between the sky condition gradient in the background of each page, and the precipitation value in the forefront.

In addition, the sizes of the icons were scaled according to the value of precipitation (mm and cm combined). More precipitation meant a larger icon, and less precipitation meant a smaller icon. Overall, the upper limit was based on the highest precipitation value of the year, which was 78mm and occurred on July 27, 2014. The lower limit was based on the lowest precipitation value of the year, which was 0.2mm, and occurred several times throughout the year. Based on these two values, I developed a size for each value of 1 mm (Figure 34).

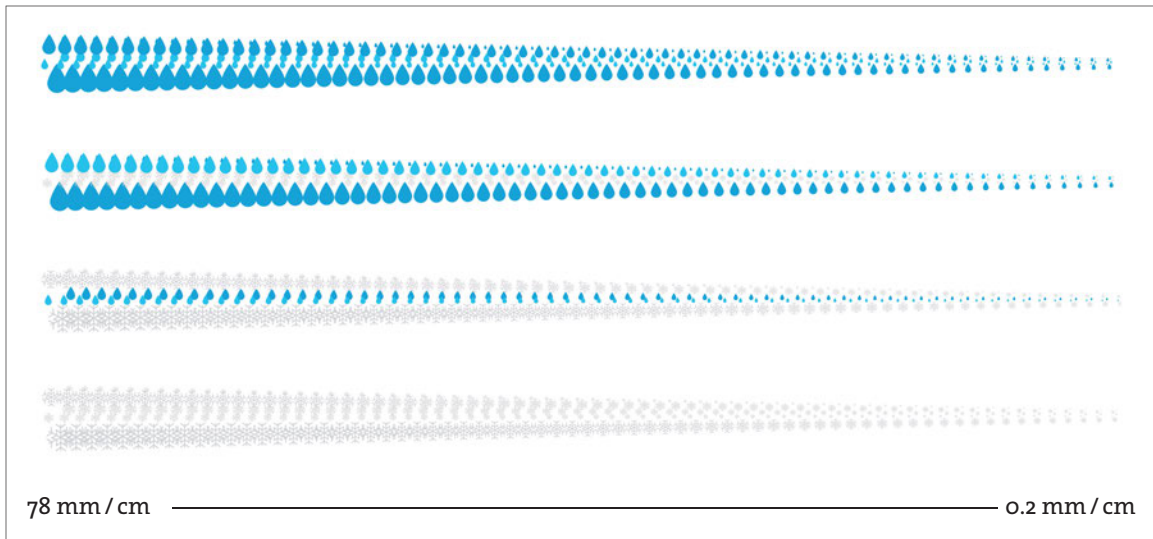


Figure 34

Size for each value and precipitation. Jean, Philippe. 2015

For example, 78 mm took up virtually all of the space on the page, while 1 mm took up only a small portion of the page. If the value was higher than 0.5mm, then it was rounded up to 1mm. Only data less than 0.5mm was included in the project (0.4, 0.3, and 0.2). Thus, all these rules were applied throughout the all 365 days of the year (Figures 35, 36, 37, 38 & 39).



Figure 35
January 9, Clear. *Weather Yearbook*.
Jean, Philippe. 2015

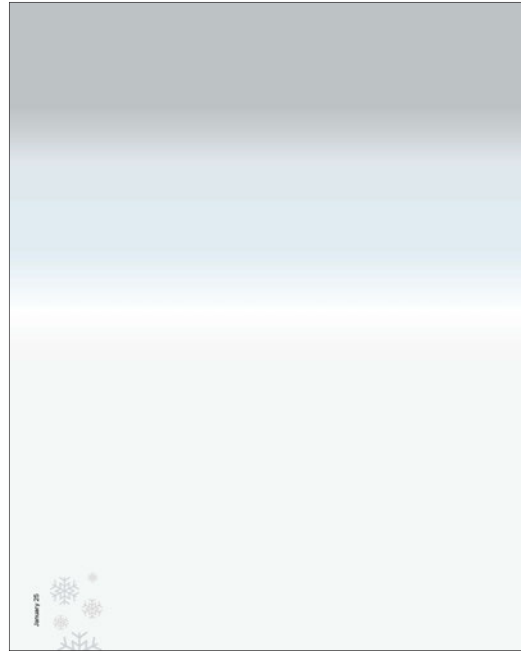


Figure 36
January 25, Snow 4 cm. *Weather Yearbook*.
Jean, Philippe. 2015

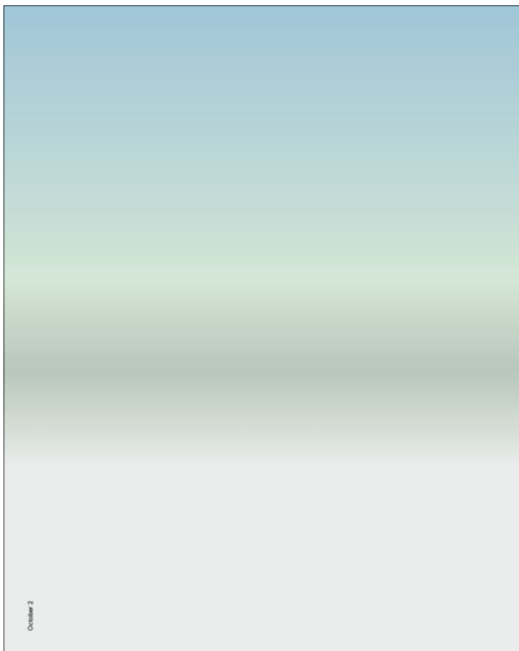


Figure 37
October 2, Fog. *Weather Yearbook*.
Jean, Philippe. 2015

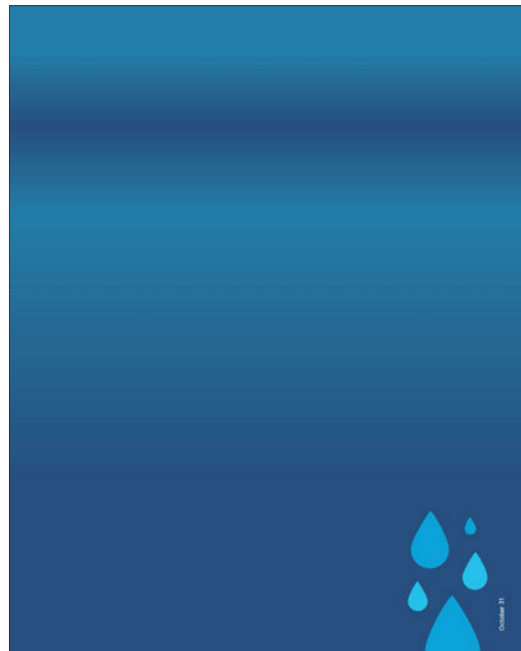


Figure 38
October 31, Rain, 13 mm. *Weather Yearbook*.
Jean, Philippe. 2015

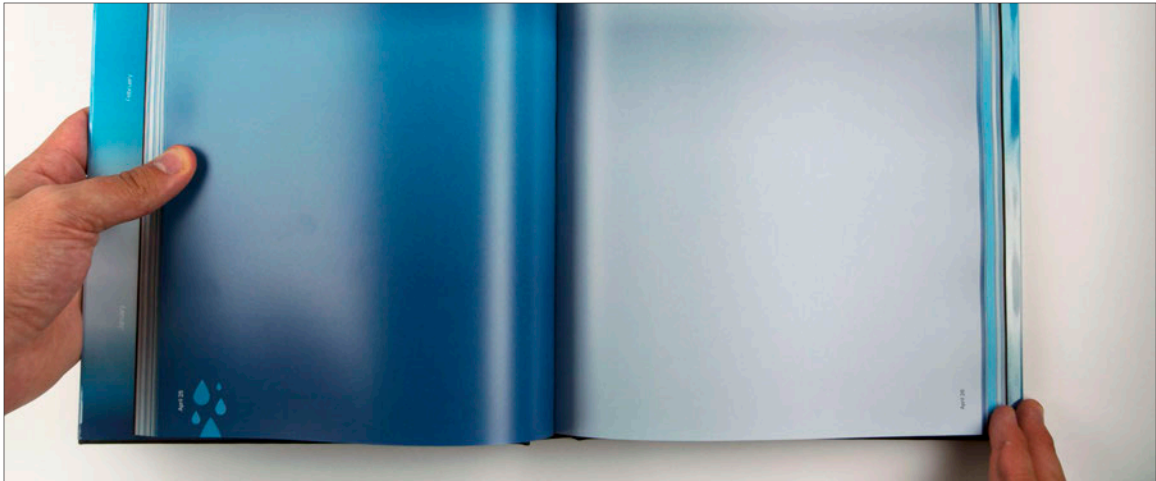
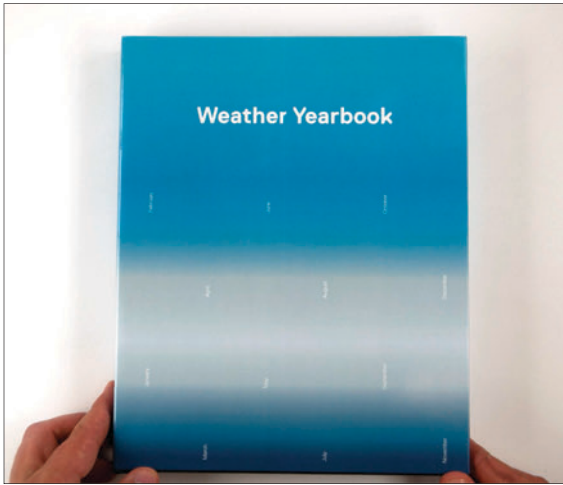


Figure 39
Weather Yearbook.
 Jean, Philippe. 2015

11.1.3 Evaluation

My first set of observations was that the synthesis (design) stage was the most important of all stages. This is because the synthesis stage was where I created conceptual constraints, made design decisions and created visuals. In addition, I observed that I did not perceive conceptual constraints as an imposition, but rather as a unifying element. If I was not satisfied with the results, I modified the conceptual constraints or the visual as required.

My second set of observations was that the iteration between the evaluation and synthesis (design) stage allowed me to develop a visual environment almost devoid of text—with the exception of the mention of dates. A certain degree of understanding of the content was maintained despite the lack of textual information, and the visual representation left room for interpretation.

This project opened up an alternative way of distinguishing the content from its banal (i.e. overabundance of data) context, by displaying it in a narrative structure. As a result, instead of displaying a large amount of quantitative data via a series of columns, the format shifted the reading to one that was more qualitative and experiential. At the same time, this project enabled readers to engage the content as they would a book; that is, in a linear fashion from a starting point to an ending point.

Ultimately, the *Weather Yearbook* project demonstrated that it was possible to liberate banal information by shifting the context of excessive data via the analogy operation. Furthermore, the absence of text paired with saturated and vibrant colours enabled greater subjective interpretation and engagement. I also believe the atypical book format (atypical with respect to displaying weather data) used in this project supported a degree of uniqueness and surprise, which enhanced the overall concept.

11.2 Weather Shaker Mobile Application

In this project, *I explored how the analogy operation could be used to liberate banal information—specifically current weather data—from its traditional textual representation.*

11.2.1 Analysis

The Weather Shaker is an iOS mobile application that displays current weather information based on each user's location. It was developed in an attempt to promote a dynamic and engaging experience of weather data content, as the lack of both dynamism and engagement in the reading experience is a recurrent issue in weather data representation due to its traditional textual and table-based format. As such, the criteria for success of my visual propositions were whether the potential for engagement/interaction between users and weather data was realized, and whether the potential dynamism of illustrative representation was emphasized by the mobile application.

Furthermore, contrary to other popular weather apps such as *The Weather Network* and *Yahoo Weather* that offer weather archives along with current weather conditions and forecasts, *The Weather Shaker* eliminates this extraneous information and specifically focuses on four elements: Temperature, RealFeel, Wind Speed and Wind Direction.

For the purpose of this exploration, I extracted these four elements from weather conditions (Figure 40) for the city of Toronto on Friday, April 24 at 11:38pm:

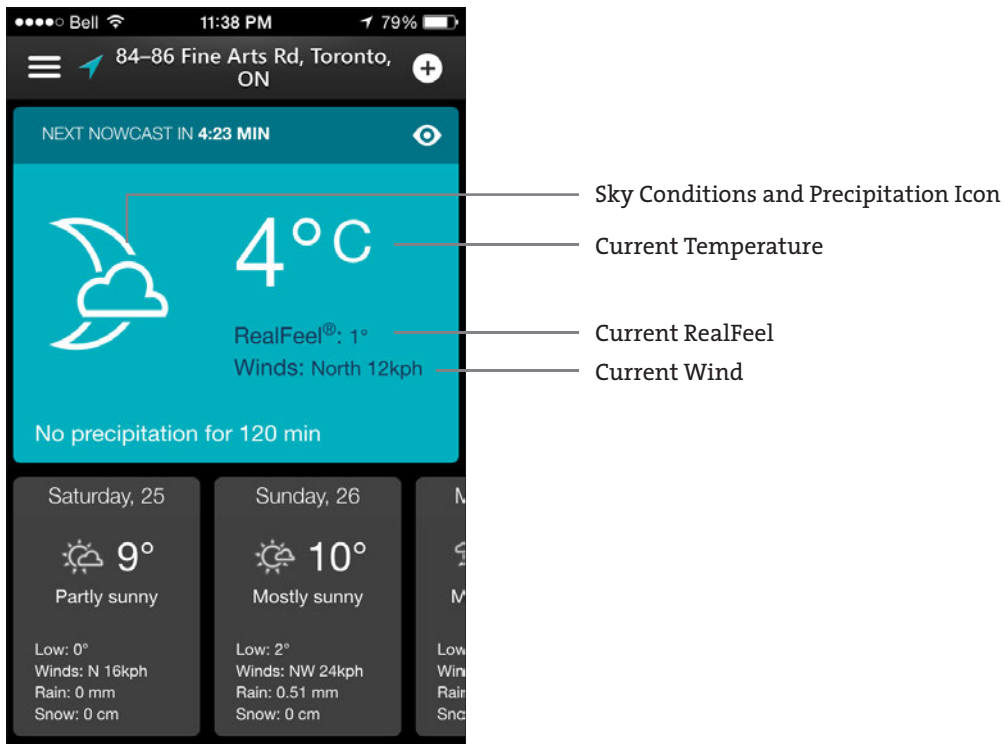


Figure 40

Weather conditions for the city of Toronto on Friday, April 24 at 11:38pm extracted from *AccuWeather*.

I selected these elements because of their contrasting values, for they were the most important information to ensure the reader's understanding of a weather forecast, and were thus suitable for a minimalist app that focused only on current weather conditions.

11.2.2 Synthesis

Like the *Weather Yearbook* (Page 50) project, the synthesis stage was important because it allowed me to create rules and conceptual constraints while I was participating in the design process. However, unlike the *Weather Yearbook* project that used a single visual analogy system, *The Weather Shaker* app incorporates a range of

visual analogy systems that users can change directly from their mobile device. As a result, if a user doesn't find a specific visual proposition attractive or accessible, then he or she can tap a button or shake the mobile phone vertically to be presented with a new visual system that better suits his or her needs.

However, with a wide range of visual systems available, it was important to develop a consistent visual hierarchy so that users would not be disoriented or confused. To achieve this consistency, the upper part of the screen always displays the wind direction and speed, the central part of the screen always displays the current temperature with the condition of the sky (icon), and the lower part of the screen displays the current RealFeel temperature (Figure 41).

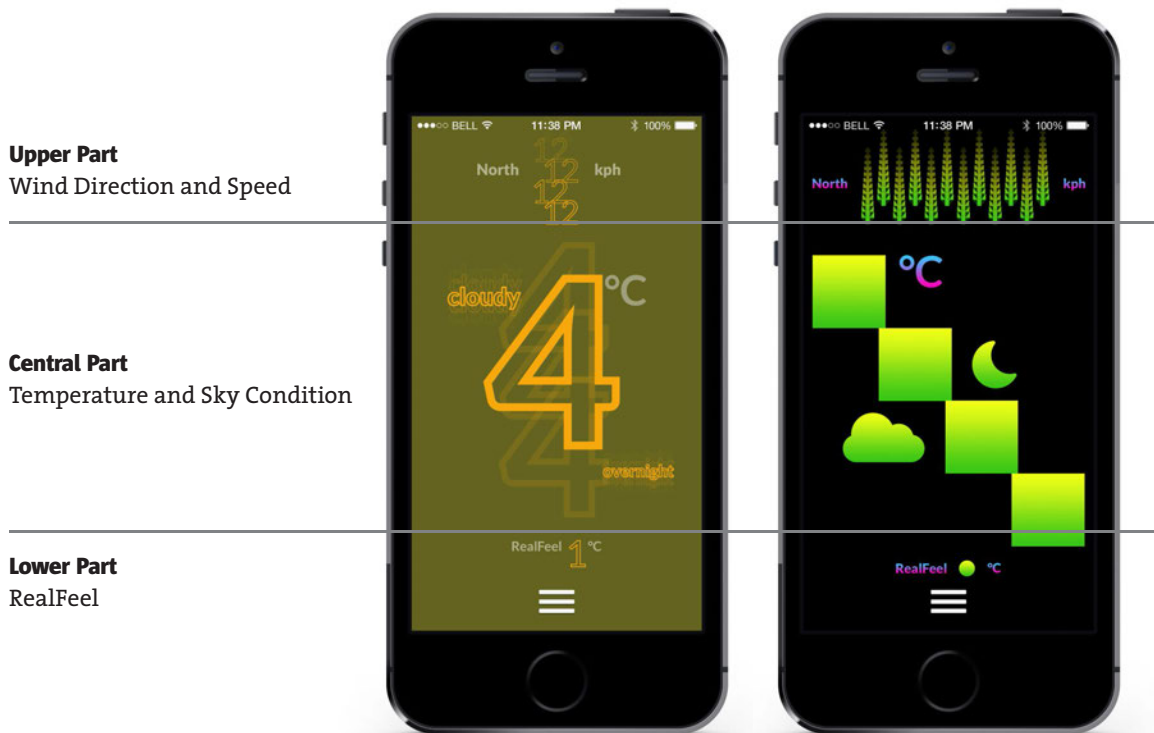


Figure 41

Universal hierarchy consistency content division within the layout of *The Weather Shaker* application. Jean, Philippe. 2015

In addition, the app's main button (Figure 42) can trigger three actions: generate a new visual system, display a legend of the visual system, and access the settings menu.

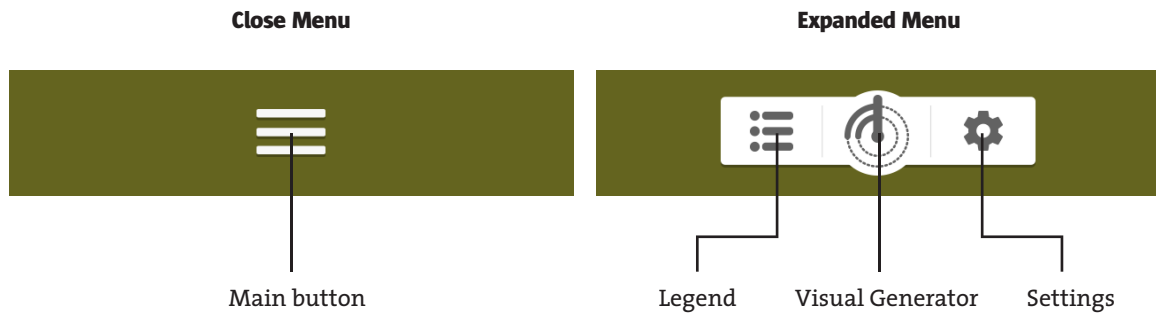


Figure 42
Minimalist interface button of the Weather Shaker application. Jean, Philippe.
2015

The decision to use a minimalist interface consisting of a single button with 3 options was based on a desire to promote a unique visual experience that foregrounded the chosen weather information. In the same line of thought, the app has been conceived so that users don't have to input their location in order to keep the user experience as simple as possible. As such, the app immediately detects location when it is launched.

Also, all visual systems were developed following specific themes that made use of a single graphic device such as: typography, geometric flat shapes, gradient color, geometric 3D perspective approach, etc (Figures 43, 44, 45).

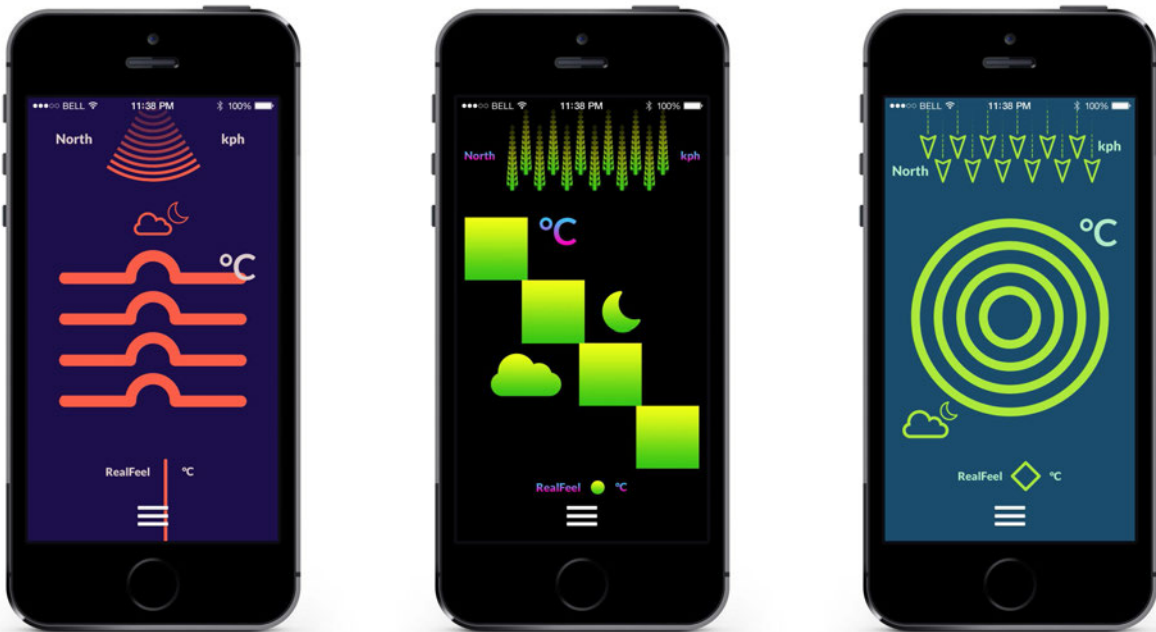


Figure 43
 Visual system based on the exploration of geometric flat shapes.
The Weather Shaker. Jean, Philippe. 2015



Figure 44
 Visual systems based of the exploration of typography. *The Weather Shaker.*
 Jean, Philippe. 2015

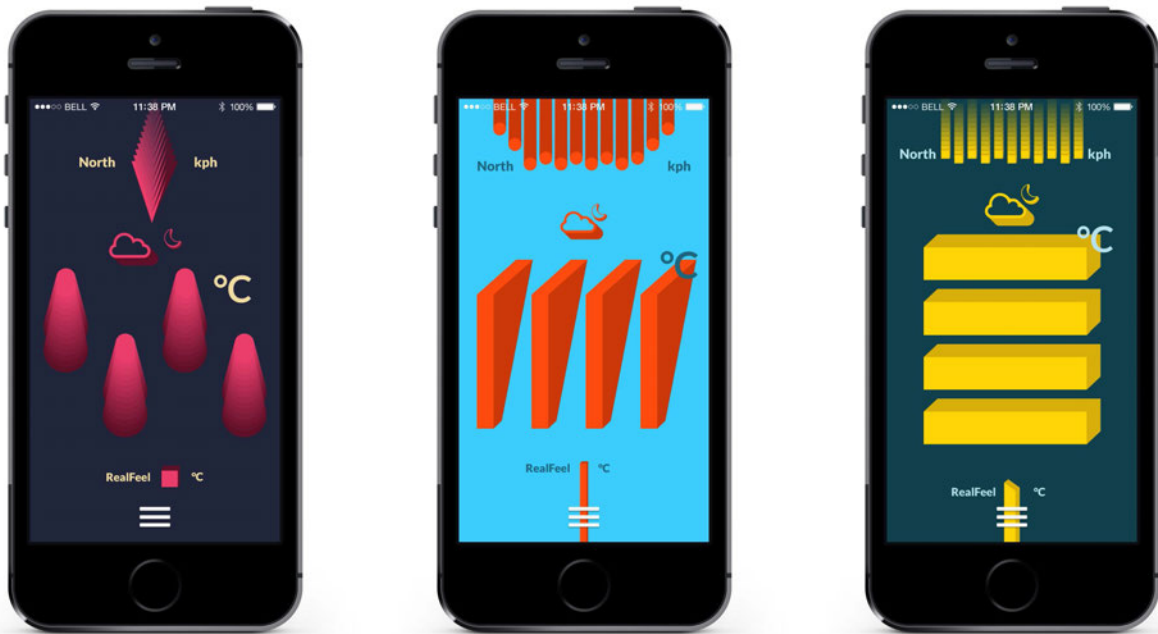


Figure 45

Visual system based on the exploration of geometric 3D perspective.

The Weather Shaker. Jean, Philippe. 2015

11.2.3 Evaluation

For this project, I did not view rules and conceptual constraints as fixed, but rather as guidelines to interpret. The objective was not to develop a visual structure that would place the emphasis on one of the four weather elements, but to develop a range of visual systems making use of analogy to offer an engaging and attractive user experience.

In the book *Windows and Mirrors*, Jay David Bolter, a professor and researcher at Georgia Institute of Technology and Diane Gromala, a professor and researcher at Simon Fraser University's School of Interactive Arts and Technology, note that "to design a digital artifact is to choreograph the experience that user will have" (Bolter and Gromala, 2005, 22).

The authors also point out that good digital design interaction is not just about using the product, but also about generating an experience: "Good digital designs invite us to participate, to act and react" (Bolter and Gromala, 2005, 22).

In light of this, *The Weather Shaker* mobile app uses a range of visual system options to make more compelling four elements from a weather report (Current and RealFeel temperature, Wind Speed and Direction, and Sky Condition) that may otherwise be perceived as ordinary and banal. This approach fosters a positive user experience as described by Bolter and Gromala, because it generates a variety of experiences, and invites curious end users to actively engage with the app and modify the display settings to see the various visual possibilities and select the interface that better suit their needs.

Effectively, this approach is interactive and empowers users by providing them control over the visual displays. Allowing the users to change the visual display on demand can improve the users' comprehension of the information itself. For example, if a user finds that a certain visual system requires extra attention or does not allow for a proper understanding of the data, he or she can change it to something else that is more readily accessible and understandable (Typographic themes, Figure 44). Alternatively, users who want a more stimulating experience can change the visual display to something that they feel is more challenging or intricate (geometric 3D perspective, Figure 45).

Finally, this project has paved the way for additional research as user testing would be necessary to identify which visual systems/themes are more or less successful.

12. Mutation As Creative Operation For Design Exploration

With the mutation operation, the form of some particular feature, or features, of an existing design is modified (Cross, 1997, 435). It derives from computer modeling, where mutation is the alteration of a structure variable by an external agent (Gero S., John, 1994, 15). In my project, mutation enabled me to transform the content from one form to another, in order to create new visuals, while maintaining the original characteristics, as well as the original visual structure as a starting point.

In the book, *L'écartelage ou l'écriture de l'espace d'après Pierre Faucheux* (Chancogne, 2013), the French typographer and graphic designer Pierre Faucheux demonstrates how he incorporates a surrealist approach to mutation into his work. The image below (Figure 46) shows how Faucheux used mutation in an charismatic and provocative way, by cutting up several identical reproductions of a painting into multiple parallel strips, and pasting them together to produce a distortion of the original image (Hollis, 2014, no. 88, vol 22).

The transformation provides enough information for viewers to decode the original material, while also creating another level of reading and interpretation by accentuating the dynamic movement of the characters.

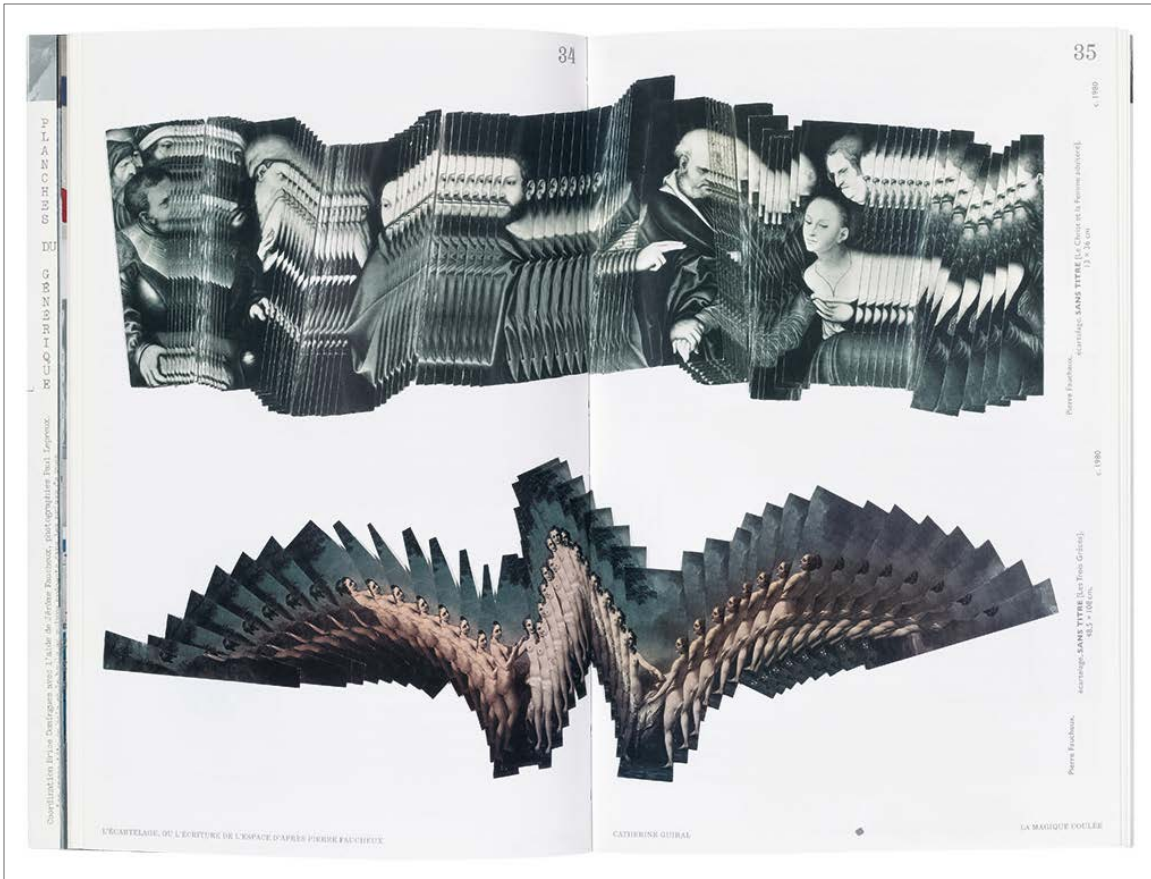


Figure 46

Example of collage production of Pierre Fauchoux.

Thierry Chancogne et al. *L'écartelage ou l'écriture de l'espace d'après Pierre*.

Paris: B42. 2013

12.1 Distortional Weather Report Poster

In this project, *I explored how distortion can be used with the mutation operation in order to liberate banal information from its conventional context and neutral visual structure.*

12.1.1 Analysis

For this project, I used the weather report from April 21, 2015 for the city of Toronto as forecasted by the *Toronto Star* newspaper (Figure 47). I selected weather reports because the information is presented in a consistent neutral format on a daily basis (i.e. the fixed hierarchy and layout did not allow for visual variations according to temperature, wind direction, RealFeel, etc.) and because it generally appears in the same location of the newspaper each day, thus not allowing readers to rediscover the data based on a change in its presentation and surroundings, a recurrent issue with weather data representation. As such, I established that a visual proposition was successful if it emphasized the connection between the visual organization of the piece, the format of presentation, and the perception that the reader has of the content, all that while proposing an alternative that could offer a different reading of weather information not possible in the standard weather format.

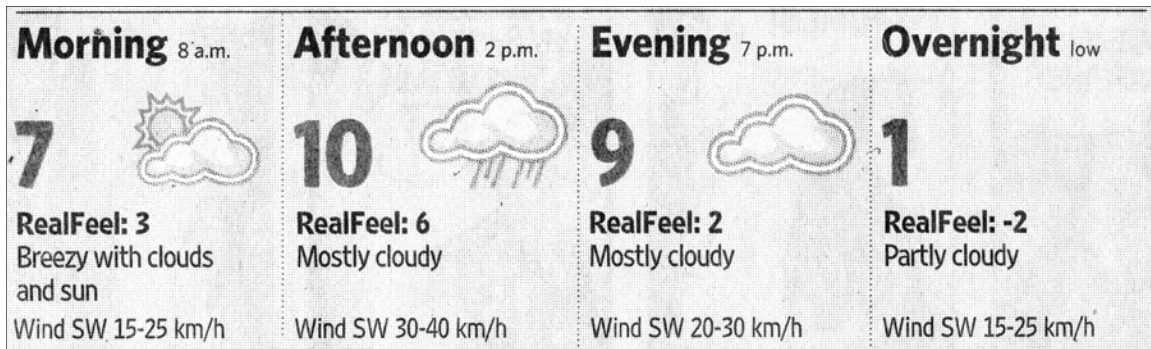


Figure 47

April 21 2015, Weather Report *Toronto Star*

I established specific mutation techniques to explore various visual possibilities. Specifically, using manipulation techniques such as collage, scanning, duplications, etc., I distorted the various elements contained in the original layout of the weather report, while making sure that they remained recognizable and readable.

The content of each time period was then manipulated separately and a poster was designed for each of them. The decision to use a poster format was based on the fact that the large size would allow for a visual impact that cannot be achieved in the traditional newspaper format. Additionally, the poster format allows to change the context in which the weather data is presented (ie on a wall, possibly in a public environment, rather than in the newspaper and examined in a private setting). This displacement encourages readers to pay more attention to both the visuals and the content, generating an experience that is out of the ordinary, refreshing and thought provoking.

12.1.2 Synthesis

This project was quite stimulating, because all of the conceptual constraints established during the analysis stage were sufficiently clear to provide specific direction, while leaving enough room to explore a diverse range of methodologies for visual creation.

I interpreted the content and structure of the original weather report as elements that could be altered. I opted to explore various ways to distort the elements by photocopying and repeatedly scanning the original layout. Once satisfied with this first visual alteration, I used collage to create a composition that juxtaposed the newly created visuals with the original weather report.

Four different compositions were created, each one corresponding to a different period of the day. However, some visual systems were duplicated and used in each composition in order to maintain some degree of visual consistency from poster to poster (Figures 48,49,50,51 & 52).



Figure 48
Central composition built with strokes for visual emphasis on temperature. Jean, Philippe. 2015

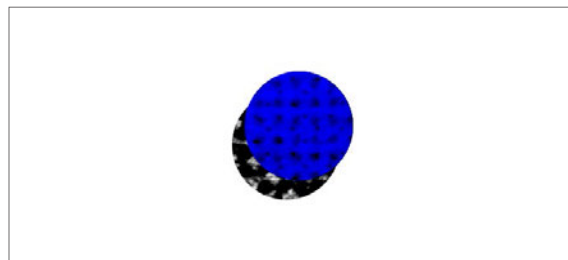


Figure 49
Circles for visual emphasis of RealFeel Temperature. Jean, Philippe. 2015

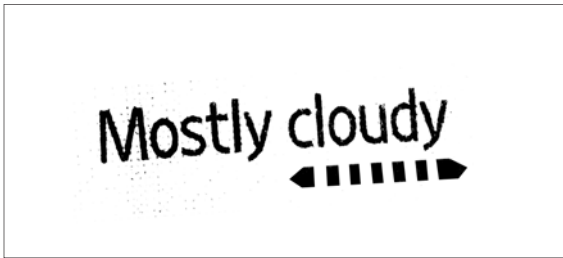


Figure 50
Contextual black strokes for visual emphasis on elements of the weather description Jean, Philippe. 2015

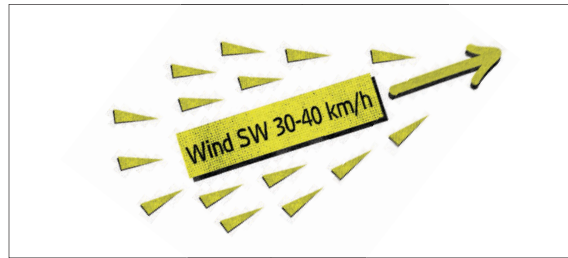


Figure 51
Composition built with triangles for visual emphasis on wind direction. Jean, Philippe. 2015



Figure 52
Time of day information distorted according to the evolution of the day. Jean, Philippe. 2015

Within these four posters (Figures 53, 54, 55 & 56), all systems of mutation were designed to respond to the value of the content :

- all geometric forms (lines, circles, triangles) present in the grain of the paper and the halftone texture of the ink were used in the collaged elements and associated to a specific element of the weather report (temperature, realfeel, wind or realfeel);

- the mentions of time of day were cut and manipulated via photocopying; hand gestures were used during the photocopying process to create a “stretched” look, which emphasized the differences between the four time periods; and
- specific keywords were underlined in each textual description to emphasize the variations of the weather conditions throughout the day.

The overall hierarchy from the original matrix was modified to increase the connection between content and visual elements, and offer a new reading experience.

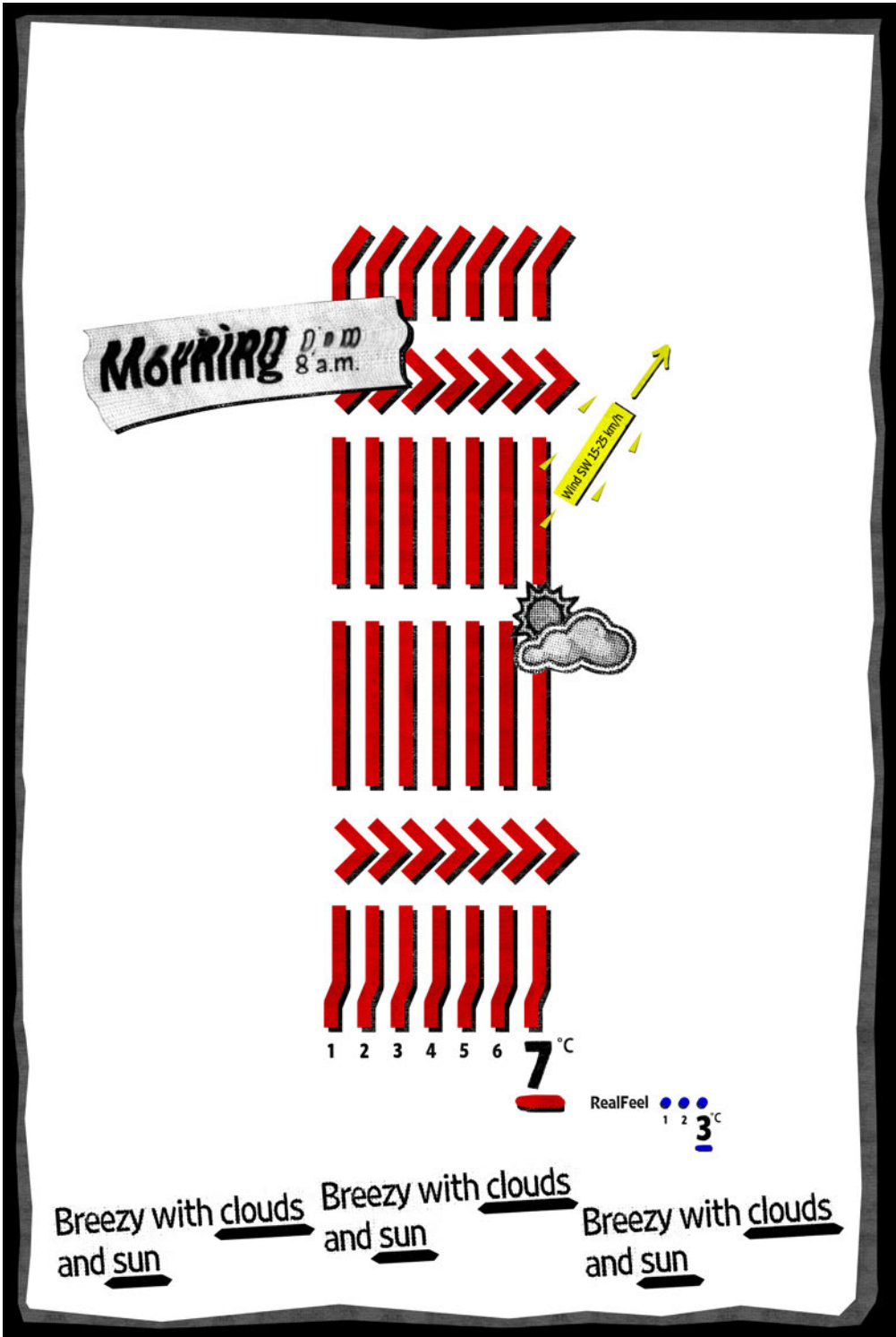


Figure 53

Weather forecast for the morning of April 21, 2015.

Jean, Philippe. 2015

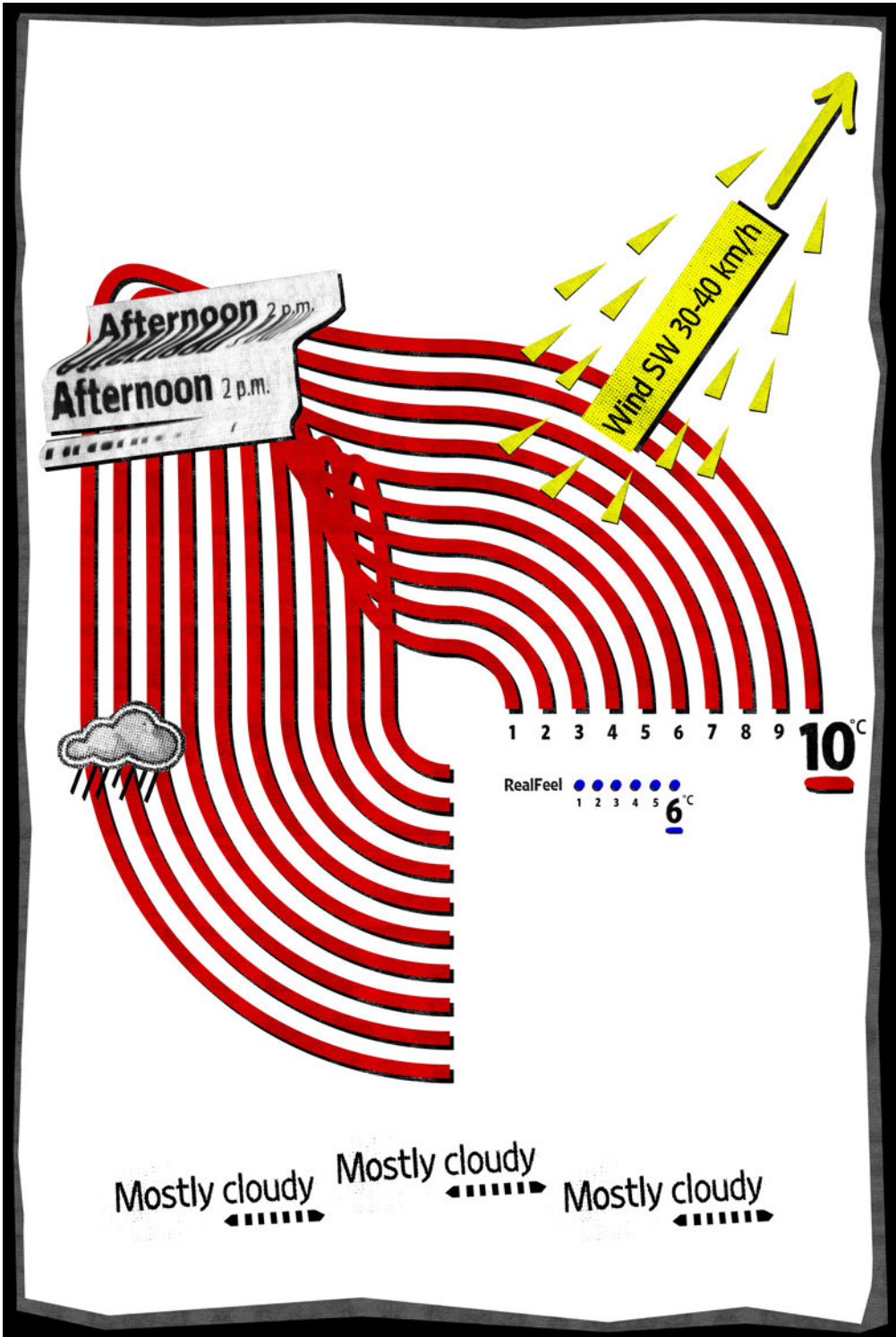


Figure 54
 Weather forecast for the afternoon of April 21, 2015.
 Jean, Philippe. 2015

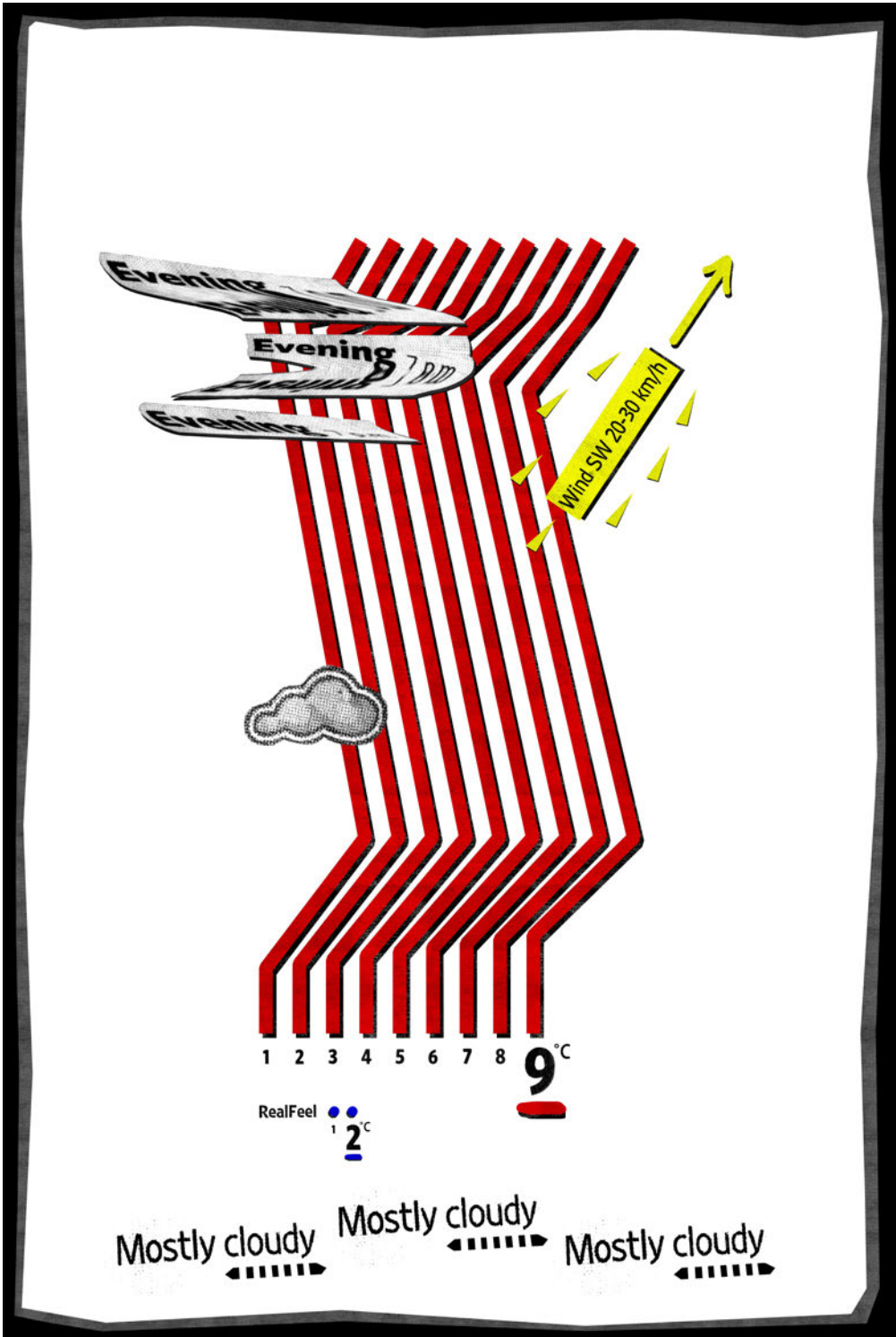


Figure 55

Weather forecast for the evening of April 21, 2015.

Jean, Philippe. 2015

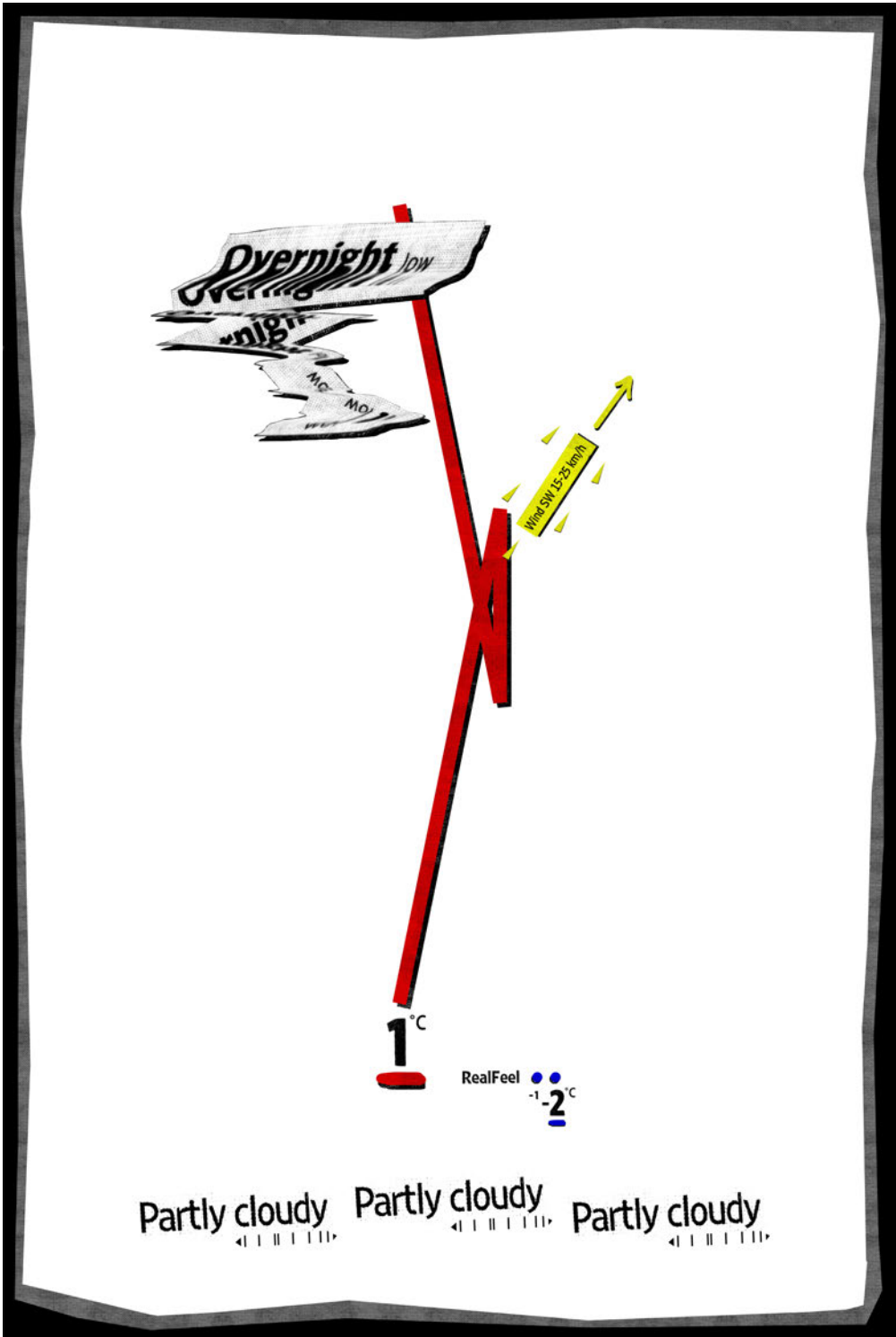


Figure 56

Weather forecast for the overnight of April 21, 2015.

Jean, Philippe. 2015

12.1.3 Evaluation

Combining mutation with the use of distortion as a manipulation technique empowered me to break certain design routines, and inspired me to familiarize myself with new approaches to making. In particular, the conceptual constraint of distorting physical material (printed version of the *Toronto Star*) gave me an exceptional starting point to explore.

I observed that the biggest challenge was establishing comprehensible connections between mutational distortions, visual elements, and data. Several iterations were needed between the synthesis stage and the evaluation stage, in order to find the right balance between clarity of communication and freedom of interpretation.

This project succeeded in its attempt to liberate banal information from its conventional context and visual structure as it ultimately presented weather data in an alternative and more emotional, engaging manner. This was achieved by maintaining some visual features of the original weather report, and mutating them through distortion techniques in order to create a whole new visual approach. This approach gave a more dynamic and expressive quality to the original content, which was originally presented as neutral and banal. Through mutation, this content was refreshed and re-invented. This re-invention was further enhanced by the use of the poster format, and even more, by placing four posters side-by-side as this new visual display powerfully changed the context of the information and, as a result, changed how the content was interpreted.

Effectively, the private reading experience normally associated with “checking the weather forecast” in the newspaper was transformed into a public experience through the use of the poster format. Since the viewing context was changed, the meaning of the data and the reading experience were altered despite the fact that the content was left unchanged. The final output thus invited readers to view the information in a new and more engaging way.

12.2 Typographic Weather Report Book

In this project, I explored *how the mutation operation can be used with typography in order to liberate banal information from its neutral and conventional context and visual structure.*

12.2.1 Analysis

This project was an attempt to solve the issue of the negative public perception of the information present in weather reports (considered uninteresting), and the lack of possibility for individual and original interpretation derived from the use of a traditional visual structure. For this purpose, I decided to choose the weather report for Saturday April 4, 2015 as published in the *Toronto Star* newspaper (Figure 57). This was an appropriate selection, because my goal was to apply the process of mutation on the structure of the layout and content of something that was widely understood in the same way by a large mass of readers.

As such, the visual propositions were deemed successful if the visual transformations participated in challenging the traditional hierarchy of the content, thus allowing alternative meanings to emerge without altering the content itself.

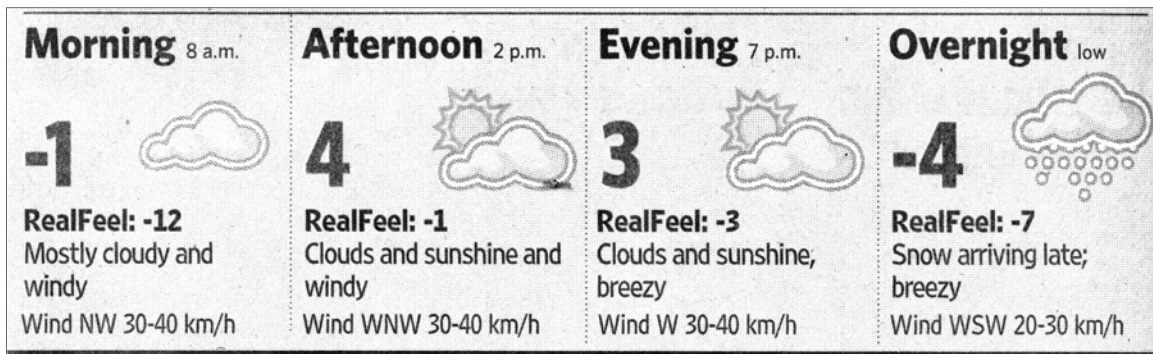


Figure 57

April 4 2015, Weather Report *Toronto Star*

From a content point of view, this specific day was chosen because of the wide variety and contrast of weather conditions, including: temperature, wind speed, wind direction, sky condition, and type of precipitation.

I established specific mutation constraints to explore the various possibilities arising from typographic manipulation of various elements, such as scaling and positioning. The objective was to investigate the typographic content free of its usual side-by-side arrangement, while retaining the original visual elements (e.g. icons and strokes).

12.2.2 Synthesis

This exploration focused mainly on disrupting the conventional visual structure through transformations based on the mutation operation. I thus developed an

amalgam of different visual systems. To achieve consistency with the original layout, I kept small visual elements, such as strokes, icons, and typeface, but transformed the original visual structure. This transformation was very fluid, diverse, creative and involved manipulating various visual elements, such as:

- scale modification according to the value of the temperature;
- reading orientation according to the wind direction; and
- position modification according to the time of the day.

Essentially, I transformed the weather forecast data by focusing on more expressive typographic treatments (Figures 58, 59, 60, 61 & 62), and thereby liberated the text from its fixed, restrictive format. However, I retained the original content (i.e. the data itself), in order to ensure that readers would be able to grasp the meaning.



Figure 58

Emphasizing temperature values by transforming scaling and positioning.

Typographic Weather Report Mutation Book. Jean, Philippe. 2015



Figure 59

Emphasizing the passage of time throughout the day by transforming

positioning. *Typographic Weather Report Mutation Book*. Jean, Philippe. 2015



Figure 60
Emphasizing sky conditions based on text descriptions. *Typographic Weather Report Mutation Book*. Jean, Philippe. 2015



Figure 61
Emphasizing wind direction by transforming reading orientation. *Typographic Weather Report Mutation Book*. Jean, Philippe. 2015



Figure 62
Typographic Weather Report Mutation Book.
 Jean, Philippe. 2015

12.2.3 Evaluation

Unlike in the project *Wednesday, A mix of Sun and Cloud High 22* (Page 38) where permutations generated all possible proposals, in this project I was able to change my approach when I arrived at a point where no further development was possible since I had the freedom to subjectively interpret rules. As such, I could freely move from one direction to another when I felt that my attempt to manipulate and transform structure and content was not constructive.

At the same time, using mutation as a generator of conceptual constraints empowered me to break certain design routines, and inspired me to exit my comfort zone and familiarize myself with new approaches.

Additionally, by emphasizing specific elements of the content through visual transformation, I created a new visual structure that was inspired by, but independent from, its original source. Since the hierarchy of information was altered as specific elements were given more importance than others, this transformation allowed me to introduce an alternative understanding without altering the content itself.

Finally, in terms of the effect that the use of mutation had on my design process, the possibility to place the emphasis on specific elements of the content (temperature, time, wind direction, etc) and to alter the visual structure following a great variety of conceptual constraints gave me the ability to explore more visual possibilities and ultimately enrich my working process.

13. Conclusion

In this thesis work, I investigated how conceptual constraints can be used within the design process to facilitate the creation of visual propositions that liberate banal information from its structured, restrictive and mass consumed context and allow the development of alternative meanings with weather data.

Firstly, the use of combination allowed me to compare an automated approach to generative design, with a manual approach to visual exploration. This was illustrated by the project *Wednesday, A Mix of Sun and Cloud, High 22* (Page 38) which liberated weather data from its characteristically dull visual, textual and temporal elements, and promoted a new, interesting and engaged way for me to approach the information.

In addition, the use of generative design allowed me to develop a alternative approach to graphic design, in which graphic designers are not involved in the synthesis stage of the design process, but instead define rule sets in the analysis stage, and function as a curator of visual outputs in the evaluation stage.

Secondly, the use of analogy allowed me to link quantitative data usually displayed in a columns based visual structure, to a new world of colors and visuals, thus generating a new and interesting reading experience based on its qualitative distinctions. I did not perceive conceptual constraints as an imposition, but rather as a unifying element. If I was not satisfied with the results, I modified the conceptual constraints or the visuals as required.

Effectively, the *Weather Yearbook* project (Page 50) demonstrated that it was possible to distinguish content from its banal context (i.e. overabundance of data),

by displaying it in a narrative structure. This narrative vision was captured in a book form that told the “visual story” of daily precipitation (rain and snow) amounts from January 1, 2014 to December 31, 2014.

The Weather Shaker project (Page 58) illustrated that it was possible for a mobile app to distinguish content from its banal context (i.e. overabundance of data) and make it more compelling, by isolating four elements typical of a current weather condition report and juxtaposing them with a range of visual system options. In addition, this approach created a more engaging user experience, because users have some control over their experience as they can choose to display a new randomly generated composition if they are not satisfied with a given option. This active engagement with the app has the potential to instigate a new level of curiosity from the user, who is more likely to come back regularly on the application and create a new connection to the data itself.

Thirdly, the use of mutation allowed me to emphasize specific elements of the content through visual transformation and was illustrated in the *Distortional Weather Report Poster* project (Page 67). The distortion-related conceptual constraints with physical material (specifically, the printed paper version of the *Toronto Star* newspaper), transformed what was originally a banal, neutral representation and unleashed a much more vivid, visual display. In this sense, the process of mutation gave the original material a new life, a more vivid and memorable appeal, and a more dynamic connection between the value of the content and visuals.

Also, by using a poster format and side-by-side positioning, the visual display powerfully changed the context of the information and, as a result, changed how the content was interpreted.

The affect of using the mutation operation was further illustrated by the *Typographic Weather Report Book* project (Page 77), which created a new visual structure that was inspired by, but independent from, its source. Specifically, by using a typographical approach as a conceptual constraint, the hierarchy of information was altered as specific elements were given more importance than others (temperature, time, wind direction, etc). This transformation allowed me to introduce an alternative understanding of the data, without altering the content itself. The project enabled me to explore more visual possibilities and enrich my design process.

As a whole, this framework for exploration allowed to break routine in my design practice and encouraged the exploration of a structured working method that could lead to new visual possibilities. The question now emerges: what "creative operation" is the best or most interesting? I do not believe that an objective answer exists. Each "creative operation" represents an excellent platform for developing new visual possibilities, and can therefore inspire an immense amount of creative thinking.

In my view, the creative essence of this research was a protocol examination that emerged between me as the designer, the diverse methodologies, and the "creative operations". Furthermore, I do not believe that an absolute solution or a single best approach to visual creation exists.

Rather, I believe in combining an unrestrained and personal form of exploration with a pragmatic approach, while using the "creative operations" as a protocol reference, or as a means to overcome creative blocks that emerge during the process.

The original goal of my research was to demonstrate how conceptual constraints can be used by designers to develop an environment that fosters creativity. Additionally, I intended to show how the "creative operations" can be used as an alternative way to drive the design process. In summary, this inquiry demonstrated that designers:

- have an opportunity to generate novel designs breaking away from established routine even when the content is banal;
- should be aware of their approaches when engaging in the process of creative visual design, because this awareness enables them to question their methods and potentially make better decisions during their development work; and,
- need to understand the value of combining a systematic approach to visual exploration with free self-expression, because it allows designers to find inspiration when routine habits, or successful historical ways of working lead to a creative block or a lack of new and innovative solutions to a design problem.

This investigation as a whole participated in challenging the perception of weather information as banal information (perception caused by several factors, such as neutral and conventional display, overrepresentation in the media, etc.). Effectively,

the content was used as a starting point for the generation of various, interesting visual solutions, highlighting its incredible richness in the data. As a result, while I still perceive that weather information can be banal, generally due to its pervasive presence in everyday life, I observed that this same content has originality and dynamic value when combined with engaging visual representations.

Upon reflection, it is important to mention that this research establishes a good basis for the potential development of various user studies. For example, it would be interesting to develop a series of user studies for *The Weather Shaker Mobile Application* project (Page 58) in order to determine which visual category (typographic, geometric flat shape and geometric 3D perspective shape) allows readers to understand the content most easily, as well as which category is more difficult to interpret, or requires a further understanding due to their level of complexity. I could also ultimately introduce a 4th category for testing, such as a visual collage analogy and determine the readers' level of understanding through these user studies.

Ultimately, user studies would allow me to better grasp the limits of a conceptual approach to visual representation in relation to a reader's understanding of the content, which would affect my future visual works and the way I am creating.

Also, the intent of my investigation was to develop various techniques and methodologies related to the application of specific creative operations (combination, analogy, mutation). As such, it would be interesting to further extend this investigation by exploring how multiple creative operations can be used simultaneously. For example, it would be interesting to combine the distortion techniques used under the creative operation of mutation in the *Distortional Weather Report Poster* project

(Page 67) with the automated methodology developed under the creative operation of combination in the project *Wednesday, A mix of Sun and Cloud, High 22* (Page 38). Such an investigation would allow me to analyze the behavior of different techniques and methods within different contexts. It would also help me determine whether the juxtaposition of multiple creative operations have the potential to generate a greater variety of outcomes and more visual complexity than their individual application.

Additionally, in terms of content, my investigation was conducted by using weather information in order to change the perception of its content through alternative visual representations. This choice was justified by weather information's categorization as banal information. It would however be interesting to reproduce a similar investigation using other categories of banal information as inspired by Kenneth Goldsmith's body of work, who used *Traffic* (2007) bulletin and daily *Sports* (2008) results as subjects for investigation. Additionally, it would be interesting to use various other topics not categorized as banal information. For example, it would be pertinent to make a investigation based on diverse text-based subjects, such as literary, cultural and artistic content, in order to see how the perception of qualitative, non-numerical content is affected by the same creative operations.

Finally, this research was a way to make an investigation of my own graphic design practice. More specifically, it demonstrated how I, a designer who often works in a spontaneous, sometimes intuitive way, interpreted and integrated specific creative operations in my personal process of design. Ultimately, this research was beneficial to my practice as working within a systematic framework allowed for the emergence of conceptual approaches that were not present in my process.

This combination of a conceptual approach with formal explorations inside specific operations thus allowed me to develop fresh visual propositions, and, more importantly, lead to the development of new techniques and methods of working. As such, I perceive this investigation as a working guide that has the potential to enable the constant evolution of my graphic design practice.

14. Bibliography

- Batory, Michal. *Posters & Graphic Works*. Paris: Serge Malik ID Publishing. 2004
- Blauvelt, Koert Van Mensvoort. *Conditional Design: Workbook*. Amsterdam: Valiz, 2013
- Bolter, J and Diane Gromala. *Windows and Mirrors: Interaction Design, Digital Art, and the Myth of Transparency*. Cambridge, Mass.: MIT Press. 2005
- Chancogne, Thierry et al. *L'écartelage ou l'écriture de l'espace d'après Pierre Faucheux*. Paris: B42, 2013
- C Reas and Ben Fry. *Processing: a programming handbook for visual designers and artists*. Cambridge, Mass.: MIT Press. 2007
- Cross, Nigel. "Descriptive models of creative design: application to an example." *Design Studies*, 18(4) pp (1997). 427-440
- Cross, Nigel. *Developments in Design Methodology*. Chichester: John Wiley & Sons Inc, 1984
- Garrels, Gary. *Sol LeWitt with essays by Martin Friedman ... [et al.]*. San Francisco, California: San Francisco Museum of Modern Art, 1978
- Gero, S. and Kumar, B. "Expanding design spaces through new design variables". *Design Studies*, 14(2), 1993: 210-221
- Gero S., John. "Computational Models of Creative Design Processes". *Studies in Cognitive Systems*, Volume 17, 1994
- Gero S, Mary Lou Maher. *Modeling Creativity and Knowledge-Based Creative Design*. Kentucky: Psychology Press, 1993
- Gerstner, Karl. *Designing Programmes*. Switzerland: Lars Müller Publishers, 2007

- Goldsmith, Kenneth. "Being Boring". *Kelly Writer's House Poet's Lunch*. Web. 2004.
http://epc.buffalo.edu/authors/goldsmith/goldsmith_boring.html
- Goldsmith, Kenneth. *Sports*. Los Angeles: Make Now Press. 2008
- Goldsmith, Kenneth. *Traffic*. Los Angeles: Make Now Press. 2007
- Goldsmith, Kenneth. *The Weather*. Los Angeles: Make Now Press. 2005
- Godfrey, Tony. *Conceptual art*. London: Phaidon. 1998
- Hall, Sean. *This Means This, This Means That*. London: Laurence King Publishing, 2012
- Hollis, Richard. "Absent insights" *Eye*, no. 88 vol. 22, 2014
- Hollis, Richard. "Permanent innovation" *Eye*, no. 19 vol.5, 1995
- Hyde, Louise. "Postmodernism & Pop: New-wave typography and arts education",
The Culture Coven. 2013. Web. <http://theculturecoven.blogspot.ca/2013/12/postmodernism-pop-new-wave-typography.html>
- Kosuth, Joseph. *The Sixth Investigation 1969 Proposition 14*. Cologne: Gerd de Vries/Paul Maenz, 1971
- LeWitt, Sol. "Paragraphs on Conceptual Art", *Art Forum*, June 1967, 80
- LeWitt, Sol. "Sentences on Conceptual Art". *Art-Language*, May 1969
- Lupton, Ellen and Jennifer Cole Phillips. *Graphic Design: The New Basics*. New York :
 Princeton Architectural Press. 2008
- Maurer, Edo Paulus, et al. *Conditional Design: A manifesto for artists and designers*
Conditional Design. Web. 2013. <http://conditionaldesign.org/manifesto/>
- Nealon, Jeffrey. "RealFeel: Banality, Fatality, and Meaning in Kenneth Goldsmith's
 The Weather". *Critical Inquiry*. Vol.40 No.1 : 109-132, 2013

Noble, I and Russell Bestley. *Visual Research: An Introduction to Research Methodologies in Graphic Design*. La Vergne TN : AVA Publishing. 2011

Osborne, Peter. *Conceptual Art*. London: Phaidon Press. 2002

Perloff, Marjolie. "Moving Information", On Kenneth Goldsmith's *The Weather*. 2005

Rea, Peter. "Reputations: Dan Friedman". *Eye*, no. 14 vol. 4, 1994

Seigworth, Gregory. "Banality for cultural studies". *Cultural Studies*, 14(2), 2000: 227-268

Soddu, Celestino. *Generative Art*. Web. 1994. <http://www.soddu.it/design/>

GA_soddu_e.htm

Stokes, Patricia D. *Creativity from constraints: the psychology of breakthrough*.

New York: Springer Pub. 2006

Wood, Paul. *Conceptual Art*. New York: Delano Greenidge Editions. 2002