

Padua 2017 Abstract Submission

I want to submit an abstract for:

Conference Presentation

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Keywords

Bounded Rationality, Wine Selection, Cognitive Overload, Information Processing, Saliency, Consumer Behavior, Learning, Decision Making, Experiment

Research Question

How intelligent visual representations of wine dimensions can act as an appropriate intervention providing an opportunity to optimize learning and decision making among aging individuals in information-rich contexts

Methods

This is an integrated study based on experimental methods and crowdsourcing; we devised a novel platform that allows to study learning while performing a range of variations in task environments.

Results

The results stemming from this study are shed light on important implications for the design of communication and presentation of information for wine evaluation and selection, in complex decision environments.

Abstract

State-of-the-art.

Wine is considered to be "an information-intensive experience product" requiring ability to perceive information that is complex and uncertain (Gustafson, 2015; Bruwer, 2002; Bruwer et al., 2011; Lacey et al., 2009; Mueller et al., 2009). Wine is complex due to a high number of dimensions that characterize it, leading to wealth of information that can easily overload cognitive resources of a human brain. Wine comes in a variety of types, labels, countries of origin, age, bottles, quality levels, taste, prices, various degrees of sweetness, acidity, alcohol, and tannins (e.g. Atkin and Johnson, 2010; Atkin and Thach, 2012). Wine exhibits a variety of properties in terms of balance, body, and nose. Wine is consumed in different seasons of the year, on different occasions, it is best served at different temperatures, and it is enjoyed with certain meals. Of this almost inexhaustible list of factors most have varying levels of importance depending on the consumer in question (For review, see Lockshin and Corsi, 2012; Gustafson, Lybbert, and Sumner, 2016). Some of these information dimensions can be considered as cues that help decision makers to choose, others merely contribute to cognitive overload. All this makes wine context a highly relevant domain for the investigation of information-overload in a variety contexts, especially in the retail one (e.g. Barber and Almanza, 2006; Barber, Ismail, and Taylor, 2007; Lockshin and Cohen, 2011). The ability to understand such complex multi-dimensional information and make informed wine-related decisions plays a part in preserving both economic autonomy and psychological wellbeing, particularly among vulnerable people. Even from sensory perspective, wine is a particularly intricate beverage (J.H.,1997). Age-related sensory abilities, cognitive function (Beach and Bamford, 2014), and further cohort factors indicate that older adults often face challenges related to new information absorption, numerical and complex reasoning (Mcnab et al., 2015; Mutter et al., 2016; Samanez-larkin and Knutson, 2015), and learning. Longer life expectancies, emerging digital technologies (e.g. online wine shops (Quinton and Harridge-March, 2008)), and increasing selection of wines offered, as well as an ever increasing wealth of available information on the topic, are indeed contributing to a new socio-economic reality in which aging individuals face increasing responsibility and sometimes frustration to evaluate and select wine optimally, and more generically, manage their personal beverage consumption and make economic decisions. Despite this trend, research on how aging adults fare in choosing wine in information-rich

environment is scarce. The recent surge of consumer behavior literature has much to say about financial literacy, graph literacy, salience effects on information processing (Boddez et al., 2014; Garcia-retamero and Cokely, 2016) that determine quality of economic outcomes; however, research has concentrated mostly on decision making and learning in young adults (Henrich et al., 2010), and the question is thus as to whether it is licit to generalize such findings to an older population. In fact, whereas expertise in wine-related decision making grows with age and generally enables older individuals to navigate successfully in familiar environments, this age-related advantage may weaken when the aging wine consumer is faced with an increasing wealth of information and different modes of purchasing. Although some important experimental findings regarding age-related changes in lifelong learning capacity, decision making abilities (Depping and Freund, 2011; Rieckmann and Bäckman, 2009), cooperative decision making and risk preferences (Mather et al., 2012) have been described, research has not been extended to salience effects on learning in information-rich and fast-changing wine-related contexts: comparative studies of salience effects on learning to choose wine in complex and uncertain environments are thus needed, possibly by adopting an interdisciplinary perspective.

© Objectives.

This research project is designed to fill this gap by testing possible age-related behaviors in the way individuals learn to adapt their wine evaluations and selection strategies when facing information overload, complexity, and uncertainty. The goal is to examine whether years of experience effectively facilitate rational and constructive use of cues, regardless of their perceptual salience, when processing highly-dimensional wine information and making decisions accordingly. The answer to this question is expected to depend on the level of complexity of the task environment, and this problem thus requires an interdisciplinary approach. The idea is to enable a comprehensive understanding the effects of relevant variables (e.g., information structure, dimensionality, visual processing, salience) on attention allocation, information processing, decision making under uncertainty, and learning across the lifespan. Our study has three specific objectives that form the basis of our research strategy: (i) how individuals process complex-information about wine and make judgments and decisions accordingly; (ii) how use of multidimensional-data visualisation can be used to reduce information overload in learning environments (ii) how use of cues salience in multi-dimensional data visualization affects wine evaluation and selection.

Results and methodology.

This is an integrated study based on experimental methods and crowdsourcing. Given the objectives, we devised a novel platform that allows performing a range of variations in the task environment. Main advantage of employing a combination of experimental and computational methods is the ability to control and simplify some aspects of the environment in which wine evaluation and selection has to take place; it also provides an opportunity to make precise estimates by isolating only the relevant factors that otherwise could be difficult to do in the real world environments. The experimental method allows for a rigorous comparison across environments that only differ by how salience and predictive values are distributed across the competing dimensions that characterise wine. We rely on choice accuracy, response time, and level of confidence (Lurie, 2004; Rieskamp and Otto, 2006; Pleskac and Busemeyer, 2010). Observable judgment accuracy often determines whether a selected decision strategy works well in a given environment. Changes in accuracy may indicate changes in either environment structure or strategy, indicating some undergoing processes such as learning, adaptation, or even forgetting. In addition to observed accuracy and reward, people are prone to minimize effort and the time spent in processing information and making choices accordingly. Thus, we use both the optional-stopping, to make participants decide by themselves, and interrogation-choice tasks, to predetermine the time externally. Our experimental setup allows capturing subtle levels of confidence and providing data on how actual choices, decision speed, and levels of confidence interact with each other and whether they tap to the same latent process. The platform is devised to enable obtaining a range of information regarding learning to evaluate and choose wine. (Figure 1 illustrates the general idea behind the learning environment in which a decision maker has to evaluate a set of cues that carry unknown predictive weights and have varying levels of salience, thereby making the estimation of these weights a learning task.) The experiment can be designed to change at any point in time; therefore, the decision maker can learn about the change by learning from feedback and updating his/her beliefs accordingly. The experiment itself is designed in form of a game (e.g. using famous Chernoff faces (Chernoff, 1973; Farshid et al., 2012) in which participants have to read instructions and then make decisions for a large pre-defined number of rounds. The participants are incentivized with cash bonuses to choose accurately for correct assessments. Learning occurs in the form of a search for appropriate weights, as well as for unexpected changes of these weights. Before studying wine context, we have run some pilot experiments and found that this approach can be very effective to study

learning in complex environments. We expect to obtain the following main scientific outputs: (i) results on individual allocation of attention in multi-dimensional learning tasks, including factors that may bias the learning process; (ii) unravel the role of salient-cues in multi-dimensional learning tasks; (iii) devise experiments and models addressing the effects of discontinuous change in the structure of the task environment.

The impact.

The results stemming from this study should lead to important implications for the design of communication and presentation of information for wine evaluation and selection, in complex decision contexts. This research could thus contribute to improving wine evaluation, identification, selection, as well as consumption behavior and in turn welfare throughout the lifespan. Particular attention is paid to the needs and problems of the often-forgotten aging population, which is expected to grow further because of an increasing life expectancy but is also facing a number of important challenges imposed by an ever increasing body of new technologies and an information load proceeding with a very fast pace. From a technical standpoint, this project combines laboratory and online experiments and relies on methodologies that I recently developed, as well as new ones to be implemented during the next months. One of the outputs of this research will be the generation of a particularly flexible experimental platform to be used, as such or as a blueprint, for other studies in economic behavior. The character and methodologies on which this research is based could also provide fertile grounds for the formation of visualization tools to aid individuals in evaluating and selecting wine optimally across the life span.

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Abstract

Title: **Learning to choose: How use of salient cues can aid decision-makers to evaluate and select wine optimally**

by Inga Jonaityte

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📍 State-of-the-Art: Wine is considered to be “an information-intensive experience product” requiring ability to perceive information that is complex and uncertain (Gustafson, 2015; Bruwer, 2002; Bruwer et al., 2011; Lacey et al., 2009; Mueller et al., 2009). Wine is complex due to a high number of dimensions that characterize it, leading to wealth of information that can easily overload cognitive resources of a human brain. Wine comes in a variety of types, labels, countries of origin, age, bottles, quality levels, taste, prices, various degrees of sweetness, acidity, alcohol, and tannins (e.g. Atkin and Johnson, 2010; Atkin and Thach, 2012). Wine exhibits a variety of properties in terms of balance, body, and nose. Wine is consumed in different seasons of the year, on different occasions, it is best served at different temperatures, and it is enjoyed with certain meals. Of this almost inexhaustible list of factors most have varying levels of importance depending on the consumer in question (For review, see Lockshin and Corsi, 2012; Gustafson, Lybbert, and Sumner, 2016). Some of these information dimensions can be considered as cues that help decision makers to choose, others merely contribute to cognitive overload. All this makes wine context a highly relevant domain for the investigation of information-overload in a variety contexts, especially in the retail one (e.g. Barber and Almanza, 2006; Barber, Ismail, and Taylor, 2007; Lockshin and Cohen, 2011). The ability to understand such complex multi-dimensional information and make informed wine-related decisions plays a part in preserving both economic autonomy and psychological wellbeing, particularly among vulnerable people. Even from sensory perspective, wine is a particularly intricate beverage (J.H., 1997). Age-related sensory abilities, cognitive function (Beach and Bamford, 2014), and further cohort factors indicate that older adults often face challenges related to new information absorption, numerical and complex reasoning (Mcnab et al., 2015; Mutter et al., 2016; Samanez-larkin and Knutson, 2015), and learning. Longer life expectancies, emerging digital technologies (e.g. online wine shops (Quinton and Harridge-March, 2008)), and increasing selection of wines offered, as well as an ever increasing wealth of available information on the topic, are indeed contributing to a new socio-economic reality in which aging individuals face increasing responsibility and sometimes frustration to evaluate and select wine optimally, and more generically, manage their personal beverage consumption and make economic decisions. Despite this trend, research on how aging adults fare in choosing wine in information-rich environment is scarce. The recent surge of consumer behavior literature has much to say about financial literacy, graph literacy, salience effects on information processing (Boddez et al., 2014; Garcia-retamero and Cokely, 2016) that determine quality of economic outcomes; however, research has concentrated mostly on decision making and learning in young adults (Henrich et al., 2010), and the question is thus as to whether it is licit to generalize such findings to an older population. In fact, whereas expertise in wine-related decision making grows with age and generally enables older individuals to navigate successfully in familiar environments, this age-related advantage may weaken when the aging wine consumer is faced with an increasing wealth of information and different modes of purchasing. Although some important experimental findings regarding age-related changes in lifelong learning capacity, decision making abilities (Depping and Freund, 2011; Rieckmann and Bäckman, 2009), cooperative decision making and risk preferences (Mather et al., 2012) have been described, research has not been extended to salience effects on learning in information-rich and fast-changing wine-related contexts: comparative studies of salience effects on learning to choose wine in complex and uncertain environments are thus needed, possibly by adopting an interdisciplinary perspective.

🎯 Objectives. This research project is designed to fill this gap by testing possible age-related behaviors in the way individuals learn to adapt their wine evaluations and selection strategies when facing information overload, complexity, and uncertainty. The goal is to examine whether years of experience effectively facilitate rational and constructive use of cues, regardless of their perceptual salience, when processing highly-dimensional wine information and making decisions accordingly. The answer to this question is expected to depend on the level of complexity of the task environment, and this problem thus requires an interdisciplinary approach. The idea is to enable a comprehensive understanding the effects of relevant variables (e.g., information structure, dimensionality, visual processing, salience) on attention allocation, information processing, decision making under uncertainty, and learning across the lifespan. Our study has three specific objectives that form the basis of our research strategy: (i) how individuals process complex-information about wine and make judgments and decisions accordingly; (ii) how use of multidimensional-data visualisation can be used to reduce information overload in learning environments (iii) how use of cues salience in multi-dimensional data visualization affects wine evaluation and selection.

📊 Results and methodology. This is an integrated study based on experimental methods and crowdsourcing. Given the objectives, we devised a novel platform that allows performing a range of variations in the task environment. Main advantage of employing a combination of experimental and computational methods is the ability to control and simplify some aspects of the environment in which wine evaluation and selection has to take place; it also provides an opportunity to make precise estimates by isolating only the relevant factors that otherwise could be difficult to do in the real world environments. The experimental method allows for a rigorous comparison across environments that only differ by how salience and predictive values are distributed across the competing dimensions that characterise wine. We rely on choice accuracy, response time, and level of confidence (Lurie, 2004; Rieskamp and Otto, 2006; Pleskac and Busemeyer, 2010). Observable judgment accuracy often determines whether a selected decision strategy works well in a given environment. Changes in accuracy may indicate changes in either environment structure or strategy, indicating some undergoing processes such as learning, adaptation, or even forgetting. In addition to observed accuracy and reward, people are prone to minimize effort and the time spent in processing information and making choices accordingly. Thus, we use both the optional-stopping, to make participants decide by themselves, and interrogation-choice tasks, to predeter-

mine the time externally. Our experimental setup allows capturing subtle levels of confidence and providing data on how actual choices, decision speed, and levels of confidence interact with each other and whether they tap to the same latent process.

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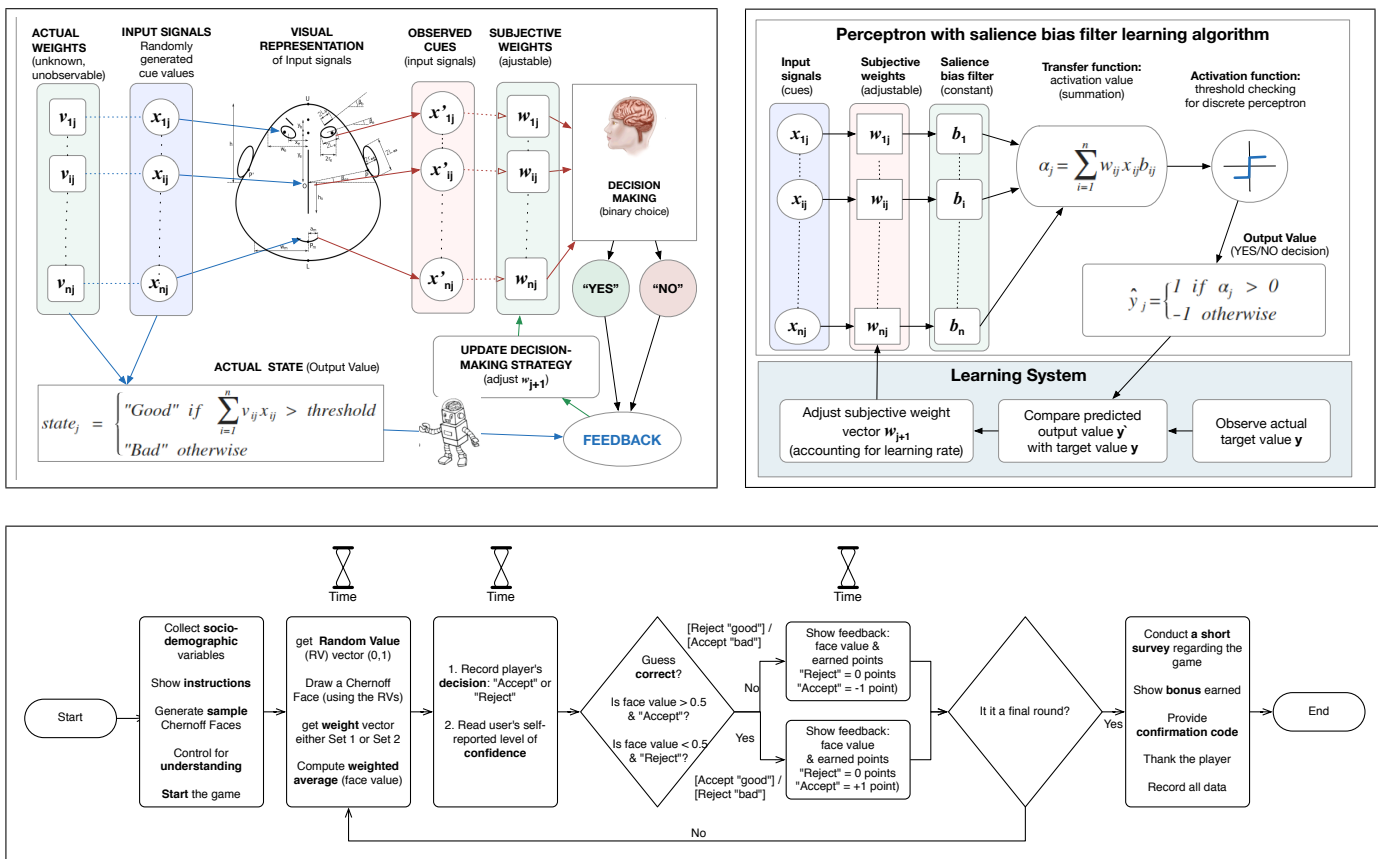


Figure 1: Stylized learning scheme (top left panel), proposed computation model (top right panel), and flowchart of experimental procedure (bottom panel)

The impact. The results stemming from this study should lead to important implications for the design of communication and presentation of information for wine evaluation and selection, in complex decision contexts. This research could thus contribute to improving wine evaluation, identification, selection, as well as consumption behavior and in turn welfare throughout the lifespan. Particular attention is paid to the needs and problems of the often-forgotten aging population, which is expected to grow further because of an increasing life expectancy but is also facing a number of important challenges imposed by an ever increasing body of new technologies and an information load proceeding with a very fast pace. From a technical standpoint, this project combines laboratory and online experiments and relies on methodologies that I recently developed, as well as new ones to be implemented during the next months. One of the outputs of this research will be the generation of a particularly flexible experimental platform to be used, as such or as a blueprint, for other studies in economic behavior. The character and methodologies on which this research is based could also provide fertile grounds for the formation of visualization tools to aid individuals in evaluating and selecting wine optimally across the life span.

References

- Atkin, T. and Johnson, R. (2010).** "Appellation as an indicator of quality." *International Journal of Wine Business Research*, 22(1): 42–61.
- Atkin, T. and Thach, L. (2012).** "Millennial wine consumers: Risk perception and information search." *Wine Economics and Policy*, 1(1): 54–62.
- Barber, N. and Almanza, B. (2006).** "Influence of wine packaging on consumers' decision to purchase." *Journal of Food Service Business Research*, 9: 83–98.
- Barber, N., Ismail, J., and Taylor, D. (2007).** "Label fluency and consumer self-confidence." *Journal of Wine Research*, 18: 73–85.
- Beach, B. and Bamford, S. (2014).** "Isolation: The emerging crisis for older men." *Independent Age & the International Longevity Centre*. [Online; accessed 9 October 2016].
- Boddez, Y., Haesen, K., Baeyens, F., Beckers, T., and Box, O. (2014).** "Selectivity in associative learning : a cognitive stage framework for blocking and cue competition phenomena." 5(November): 1–13.
- Bruwer, J. (2002).** "Marketing wine to Generation-X consumers through the tasting room." *The Australian & New Zealand Grape-grower & Winemaker*, December(491): 67–70.
- Bruwer, J., Saliba, A., and Miller, B. (2011).** "Consumer behaviour and sensory preference differences: implications for wine product marketing." *Journal of Consumer Marketing*, 28: 5–18.
- Chernoff, H. (1973).** "The use of faces to represent points in k-dimensional space graphically." *Journal of the American Statistical Association*, 68(342): 361–368.
- Depping, M. K. and Freund, A. M. (2011).** "Normal Aging and Decision Making : The Role of Motivation." pages 349–367.
- Farshid, M., Chan, A., Nel, D., tekniska universitet, L., and Institutionen för ekonomi, t. o. s. (2012).** "A sweet face man: using Chernoff faces to portray social media wine brand images." *International Journal of Wine Business Research*, 24(3): 183–195.
- Garcia-retamero, R. and Cokely, E. T. (2016).** "Communicating Health Risks With Visual Aids."
- Gustafson, C. (2015).** "The Role of Knowledge in Choice, Valuation, and Outcomes for Multi-attribute Goods." *Journal of Agricultural and Food Industrial Organization*, 13(1): 33–43.
- Gustafson, C. R., Lybbert, T. J., and Sumner, D. A. (2016).** "Consumer sorting and hedonic valuation of wine attributes: exploiting data from a field experiment." *Agricultural Economics*, 47(1): 91–103.
- Henrich, J., Heine, S. J., and Norenzayan, A. (2010).** "The Weirdest People in the World?" *SSRN eLibrary*. [Http://ssrn.com/paper=1601785](http://ssrn.com/paper=1601785).
- J.H., T. (1997).** "The physiology of human sensory response to wine: A Review." *American journal of enology and viticulture*, 48: 271 – 279.
- Lacey, S., Bruwer, J., and Li, E. (2009).** "The role of perceived risk in wine purchase decisions in restaurants." 21(2): 99–117.
- Lockshin, L. and Cohen, E. (2011).** "Using product and retail choice attributes for cross-national segmentation." *European Journal of Marketing*, 45: 1236–1252.
- Lockshin, L. and Corsi, A. M. (2012).** "Consumer behaviour for wine 2.0: A review since 2003 and future directions." *Wine Economics and Policy*, 1(1): 2–23.
- Lurie, N. H. (2004).** "Decision Making in Information-Rich Environments: The Role of Information Structure." *Journal of Consumer Research*, 30(4): 473–486.
- Mather, M., Mazar, N., Gorlick, M. A., Lighthall, N. R., Burgeno, J., Schoeke, A., and Ariely, D. (2012).** "Risk Preferences and Aging : The " Certainty Effect " in Older Adults ' Decision Making." 27(4): 801–816.
- McNab, F., Zeidman, P., Rutledge, R. B., Smittenaar, P., Brown, H. R., Adams, R. A., and Dolan, R. J. (2015).** "Age-related changes in working memory and the ability to ignore distraction." 112(20): 6515–6518.
- Mueller, S., Lockshin, L., Saltman, Y., and Blanford, J. (2009).** "Message on a bottle: the relative influence of wine back label information on wine choice." *Food Quality and Preference*, 21(1): 22–32.
- Mutter, S. A., Haggbloom, S. J., Plumlee, L. F., Amy, R., Mutter, S. A., Haggbloom, S. J., Plumlee, L. F., and Schirmer, A. R. (2016).** "Aging , working memory , and discrimination learning Aging , working memory , and discrimination learning." 0218(October).

- Pleskac, T. J. and Busemeyer, J. R. (2010).** “Two-stage dynamic signal detection: a theory of choice, decision time, and confidence.” *Psychological review*, 117(3): 864–901.
- Quinton, S. and Harridge-March, S. (2008).** “Trust and online wine purchasing: insights into UK consumer behaviour.” *International Journal of Wine Business Research*, 20(1): 68–85.
- Rieckmann, A. and Bäckman, L. (2009).** “Implicit Learning in Aging : Extant Patterns and New Directions.” pages 490–503.
- Rieskamp, J. and Otto, P. E. (2006).** “SSL: a theory of how people learn to select strategies.” *Journal of experimental psychology. General*, 135(2): 207–36. [Http://www.ncbi.nlm.nih.gov/pubmed/16719651](http://www.ncbi.nlm.nih.gov/pubmed/16719651).
- Samanez-larkin, G. R. and Knutson, B. (2015).** “Decision making in the ageing brain : changes in affective and motivational circuits.” 16(May).