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In the Minds of People. Port-City Perspectives, the Case of Rotterdam

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ABSTRACT

Following the geographical 'Any-Port Model', urban design has stipulated and enforced the disunion of port and city over the recent decades. In conjunction with other disciplines, the emphasis has laid at dislocation of production activities in favor of logistic-productive dynamics. At the same time, professional focus was on the urban areas where most citizens are. While this practice has led to redevelopment of abandoned harbor areas too, foremost the approach stimulated stronger physical boundaries between lived city and the remaining and new harbor areas. This article describes the application of the dominant model in Rotterdam over the recent decades, on the base of literature review, and, it confronts this with the concepts of Rotterdam which are in the minds of professionals-in-training, through method of 'mental mapping'. On the one hand, mainly harbor areas are memorized when respondents are asked to draw the port-city of Rotterdam, even though its efficient port infrastructure makes public space in these areas rare, and most harbors are located behind inaccessible borders. On the other hand, civic areas, which have a refined network of public spaces and are places for daily life, reveal also all kinds of tangible and intangible signs and symbols related to characteristics of the port-city when memorized; even more. Various elements, linked to water-land or the flows of goods, people, and ideas, dominate the minds of the people when they think of Rotterdam in general. These outcomes reconfirm the unique unity of port and city and provide a way to find an alternative or supplementary model accepting the complex nature of port-cities.

KEYWORDS

Port-cities; Mental mapping; Public space; Port-city models; Urban design; Urban development; Rotterdam; Networks of public space

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In conjunction with other disciplines, urban design has stipulated and enforced the disunion of port and city over the recent decades. This is seen both in professional practice as well as in the models applied. The conceptual disunion becomes particularly clear in the case of Rotterdam, representing a particular kind of port-city. Being Europe's largest seaport and one of the most populated European cities within its administrative limits, this port-city is generally seen as a world port-city, alike say Shanghai and Singapore, or Los Angeles and New York. World port-cities are linked in a global distribution network, wherein they may be each other's competitors. Rotterdam aims to be "a complete port with a strong logistical and industrial function": a 'Global Hub' and ambitiously 'Europe's Industrial Cluster'. At the same time, particularly from economic perspective, Port Authority and Municipality underline local interconnectivity: "the future of the port goes hand in hand with the future of the city".[1] They confirm a division and contrast between port and city, while acknowledging that the two are interrelated. This paradox generates a challenge. In this view, civic areas provide locational advantages in favor of port economic growth. In the same line, Rotterdam displays a certain desire to reunite port and city on more levels. For a decade now, Rotterdam plans to redevelop the harbor area of Waalhaven, the largest artificially dug harbor basin in the world, along with several other harbor areas. These areas became in disuse alike other harbors did in the past. The plan has been dubbed 'Stadshavens'; city-harbors. The Municipality and Port Authority aim to offer a greater variety of living and working environments "with a typical Rotterdam character: tough, rugged, fascinating, colored by maritime activities", according to their collaborate vision. Port-activities are gradually substituted by a mix of work and education at certain locations: combining "research, design and manufacturing", aiming to contribute to a sustainable and resilient future of the city.[2] The vision on the development and urban design reports a desire for integration of port and city. It unfolds a desire to confirm the port-city union on more levels than just economics. Notwithstanding the uniqueness of every case and without any intend to re-categorize, this article seeks for a revision to the inherited Modernist model by illustration of Rotterdam.

The Generally Accepted Port-City Narrative

We may state that port-city relationships of the Rotterdam type are unique and very different than say a coastal town with a small-sized city tightly intertwined with its small-sized port. Following the so-called '*Any-Port Model*' as introduced by High-Modern geographer Jim Bird first in the

1 Havenbedrijf Rotterdam, "Havenvisie 2030: Port Compass 'Direct the Future. Start Today.'" (Rotterdam: Havenbedrijf Rotterdam, November 15, 2011).

2 Programmabureau Stadshavens Rotterdam., "Stadshavens Rotterdam. Structuurvisie" (Rotterdam: Programmabureau Stadshavens Rotterdam, incl. Havenbedrijf Rotterdam N.V. and Municipality of Rotterdam, September 29, 2011).

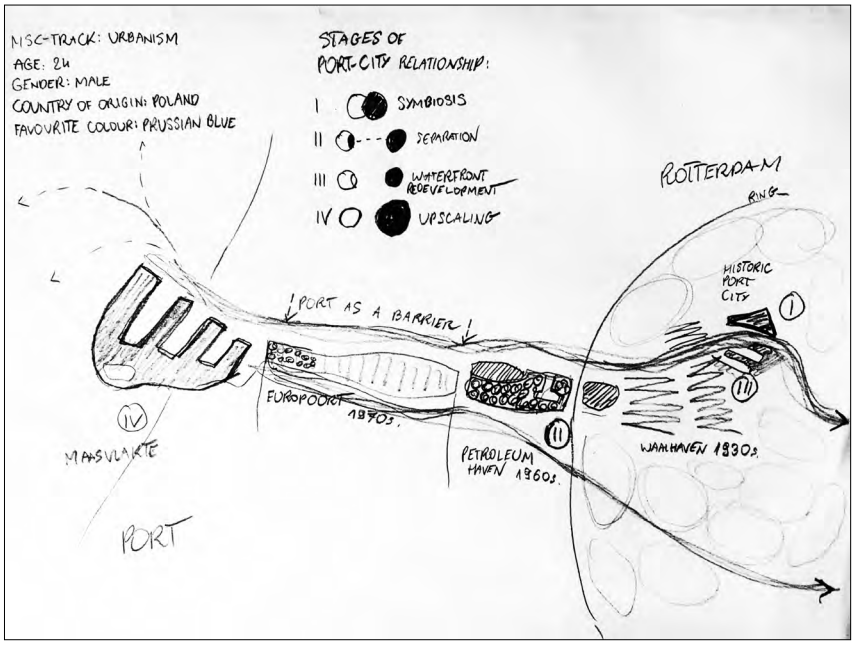

FIG. 1 Illustrating an Acculturated Understanding of a Port-City in one Response, 2020, credits trough an anonymized response in the graduate course on People, Movement and Public Space by Maurice Harteveld.

United Kingdom,[3] one usually elaborates on this by stating that such a type of world port-city evolved from its ancient settlement, through quay and dock development, via expansion and specialization, into a divided port and city. In this concept, port and city are seen as separated elements, say; 'port|city' whereby the stroke denotes division, rather than 'port-city', in which the usual hyphen joins two notions. Ports may cover all harbor areas outside of the city and are located on long distance of their cores, whereas their cities comprehend urban areas where citizens live and among others have their homes. Ports as such have grown into the sea, often by land reclamation, whereas cities as defined in the model have grown inlands. From this lens, we may recognize Rotterdam as a port, and as a city. The harbor areas are extensive and without dwellings. Notably, it includes docks for ships with a draft of twenty meters, which are designed in conjunction to an extra deep engineered channel dug in the North Sea, which lead to fully automated container terminal on the shore. Robots, with a height of more than 125 meters, dwarf any human presence. Then, indeed, what is defined as Rotterdam city seems a different world. This differentiation is persistent in the evolution of Bird's generalist evolutionary model. Primarily, his successor Brian Hoyle adds an additional period of waterfront redevelopment.[4] Abandoned harbor areas are simply seen as becoming appropriated and urban designers and area developers transform them into civic areas. The disunion of port and city remains manifest. The conceptual boundary within the two simply shifts: 'port' becomes 'city'. By presuming a linear evolution of the port|city

3 James Bird, *The Major Seaports of the United Kingdom* (London: Hutchinson & Co, 1963), 23–24.

4 Brian Stewart Hoyle, "The Port-City Interface: Trends, Problems and Examples," *Geoforum* 20, no. 4 (1989): 429–35, https://doi.org/10.1016/0016-7185(89)90026-2.

interface, the opposition persists. This conceptual division leads to a persistent and reoccurring outcome, which does neither answer to the emerging desires to reconnect port and city, nor does it present a definition and understanding of port-cities as a whole. It also does not contribute "to shape multiple layers of the built environment".[5] In other words, not the division between port and city, rather the path dependency grounded in the dominant port|city definition keeps the idea and praxis of two realities alive. Taking Rotterdam as exemplary case, this article underlines that the problem defined by a presumed separation of port and city is set in a very firm interdisciplinary postulation which effects all layers of urban design and area development of port and city, while it is firmly embedded in among others the organization and governance of both. This effects urban development [Fig.1].

The Conceptual Disunion of Port and City from Multi-Disciplinary Perspective

Given the Rotterdam case, we may argue in favor of the two-world model. We may even state that the separation between Rotterdam port and city has been manifest already in the thirteenth century, since a dam was built in its fen stream Rotte at the lower end near the river to the sea. Historically approached, this urban element not only gave the place its current name, more so it separated the early settlement along the Rotta, or 'muddy water',[6] from the natural harbor along the river, even before any modern quay or dock was designed. A city with such a dam may comprehend delineated places for harboring ships and for people in different fashions already in ancient times. As such, it opposes the linear evolution which grounds the *'Any-Port Model'*. Over time, difference between the two may be foremost a matter of scale and size. Even by following a binary port|city model, Rotterdam represents a type of port-city with harbor areas which have been *always* allocated outside the civic areas. Yet, still, the postulation of port versus city has been emphasized explicitly in urban design and development only since the 1990s. Echoing through the Hoyle-Bird narrative, the emphasis was placed at a moment when abandoned harbors were redeveloped, and further dislocation of production activities in favor of logistic-productive dynamics in the port was seen in contrast with what was envisioned as the future of the city. The considerable increase of efficient productivity gains in the port itself has emerged at the cost of jobs, and, unlike in the past, many port-related human activities have been located outside the port area, as social-geographers Ton Kreukels and Egbert Wever observed at the time. For this reason,

5 Carola Hein, "Port Cities," in *The Oxford Handbook of Cities in World History*, ed. Peter Clark (Oxford: Oxford University Press, 2013), 821–22, 825 https://doi.org/10.1093/oxfordhb/9780199589531.013.0043.

6 In Dutch, 'rot' meant muddy or cloudy, and 'a' meant water, alike more common Dutch 'aa', meaning river-like water; a water course or stream.

Rotterdam citizens had become more disconnected from the harbor than before. Also in this view, consequently the separation became clear in the networks of public space: "the spatial networks in which the port is functioning nowadays do not, unlike in the past, coincide with those of the Municipality of Rotterdam."[7] The conceptual disunion of port and city was the deliberate result of approaches in urban development, as drafted by the public government. Port and city were presumed to be conceptualized as two dichotomistic entities, port and city, each having a pull factor, each facing a possible futures: prosperity or decay.[8] The urban planning and design department of the Municipality laid a corner stone for this split port|city view on Rotterdam. It was put forward in Rotterdam City Plan a few years before, in 1992. The plan focused primarily on the city and the abandoned harbor areas near its center, while their view was blocked by the boundary of what was defined as the port. They made explicit that the vision on the port had to be pictured by the Port Authority.[9] In the professional municipal mental picture of the future of Rotterdam, the city was considered as compact and the port, though still economically essential, as part of a larger peripheral area including active harbors.[10] The whole was imagined as independent patches in a so-called carpet metropolis.[11] Within their scope, the construct resulted in two very different approaches towards the design of public space. The approach for Kop van Zuid was exemplary for what has to be achieved in the city. Form, color, and choice of materials would "express the community and metropolitan scale of the public open space, while the same design tools will stress a more personal and individual scale in spaces of a semi-public character". The approach for the areas serving Mainport Rotterdam was exemplary for the opposite view of the Port Authority. The design of the public space should serve logistics here. Important design aspects were 'the clarification of its structure through landmarks', 'the quality of its main infrastructure', 'the recognizability of relationships with the environment', 'the improvements of natural and recreational shared use', and 'visibility of port activities'.[12] The municipal port authority was privatized and transformed into a public

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7 Ton Kreukels and Egbert Wever, "Dealing with Competition: The Port of Rotterdam," *Tijdschrift Voor Economische En Sociale Geografie* 87, no. 4 (1996): 293–309, https://doi.org/10.1111/j.1467-9663.1998.tb01560.x

8 Ontwikkelingsbedrijf Rotterdam, "Naar Een Economische Visie voor (de Stadsregio) Rotterdam: Vier Scenario's: Rotterdam Wereldwijd. Rotterdam Geketend, Rotterdam Ontkoppeld, Rotterdam Getalenteerd" (Rotterdam: Ontwikkelingsbedrijf Rotterdam [OBR], 1995).

9 Dienst Stedenbouw en Volkshuisvesting, "Stadsplan Rotterdam: Een Visie op de Ruimtelijke Ontwikkeling van Rotterdam tot 2005" (Rotterdam: College van Burgemeester en Wethouders van de Gemeente Rotterdam, Dienst Stedenbouw en Volkshuisvesting, 1992).

10 Martin Aarts, *Vijftig Jaar Wederopbouw Rotterdam: Een Geschiedenis van Toekomstvisies* (Rotterdam: Uitgeverij 010, 1995).

11 Willem Jan Neutelings, *Tapijtmetropool in the Regio Den Haag en Rotterdam*, 1990, drawing, 1990, Nieuwe Instituut, Rotterdam: NEUR.t4.

12 Dienst Stedenbouw en Volkshuisvesting, "De Kop van Zuid: Buitenruimte" (Rotterdam: Dienst Stedenbouw en Volkshuisvesting, 1991); Gemeentewerken Rotterdam, "Beleidsrapport Onderhoud Buitenruimte Havengebied 1997-2001 (concept)" (Rotterdam: Gemeentewerken Rotterdam, January 1996).

limited company soon after the presentation of the two visions. It was no longer part of the municipal administration in 2004. Yet, although, the municipality of Rotterdam and since 2006 also the Dutch State became its only shareholders, in terms of governance, the port became one entity (private, from juridical perspective) and the city another (public). The future of the port, more or less independently of city, was arranged under unbundling agreements. Effectively, through these arrangements, the dichotomist port|city model became manifest in the urban fabric and the design of the public space in both port and city: "Because the roads and public spaces have been attributed to the Port Authority as part of the port authority's business, the Operational Port Agreement stipulates that the Port Authority will carry out maintenance and the technical management serving this purpose as a careful (road) manager and in such a way that that the public interest is safeguarded." This included placement of underground infrastructures in the port (cables and pipes) and the number of entrances to the private premises of the port industrial areas from the publicly accessible spaces, effecting the boundaries between them.[13] The then contemporary public private partnerships echoed through in both parts of Rotterdam, while, at the same token, it built on the age-old importance of private equity in the Rotterdam port.[14] The split governance structures, resulted in different priorities in urban design, and consequently effected the physical form of the two areas. This was recognized in morphological urban analyses highlighting the public space networks in those days. Urban designers rediscovered ancient-old patterns in the refined urbanized landscape of the city while they left the harbor areas in the port simply blank. Their eyes turned away of the "industry and harbor landscape", which was said connected to a "traffic machine".[15] Again from the view point of the design of public space, the refined street network in the city stood against the large-scale infrastructure in the port.[16] The narrative of disunion, thus the underlying port|city model, stayed quite persistent in understanding port-cities within a variety of professional fields up

13 De Brauw, Blackstone, Westbroek, "Akte van Oprichting Havenbedrijf Rotterdam NV, versie d.d. 23/28-12-2003, including Operationele Havenovereenkomst, with Ontvlechtingsdocument," 503|10691987| statute|231203_statuten.714.doc. (Amsterdam: De Brauw, Blackstone, Westbroek, December 30, 2003).

14 Paul Th. van de Laar, *Financieringsgedrag in de Rotterdamse Maritieme Sector, 1945-1960*, Tinbergen Institute research series, no. 17 (Rotterdam: Erasmus University, 1991); Brian Jacobs, "Rotterdam Scenarios," in *Trategy and Partnership in Cities and Regions: Economic Development and Urban Regeneration in Pittsburgh, Birmingham and Rotterdam*, by Brian Jacobs (London: Palgrave MacMillan, 2000), 140–60, https://doi.org/10.1007/978-1-137-05184-4_8.

15 Frits Palmboom, *Rotterdam, Verstedelijkt Landschap* (Rotterdam: Uitgeverij 010, 1987).

16 Han Meyer, *De Stad en de Haven: Stedebouw als Culturele Opgave in Londen, Barcelona, New York en Rotterdam: Veranderende Relaties tussen Stedelijke Openbare Ruimte en Grootschalige Infrastructuur* (Utrecht: Uitgeverij Jan Van Arkel, 1996); Han Meyer, *City and Port: Urban Planning as a Cultural Venture in London, Barcelona, New York, and Rotterdam : Changing Relations between Public Urban Space and Large-Scale Infrastructure* (Utrecht: International Books, 1999).

FIG. 2 Tourist taking a Photo of the Kop van Zuid from the Erasmus Bridge, 2021, credits by Maurice Harteveld.

to today.[17] The port and city of Rotterdam were considered different and have been since [Fig. 2].

Examining the Port City Model by the Method of Mental Mapping

Following the above, there seems a dominant definition of 'port-city' as legitimate acculturated understanding of what is a port-city. In an experiment, underlying this article, this was tested by applying a heuristic technique: a group of multi-disciplinary graduate students, thus professionals-in-training, were asked to draw two familiar but different maps by mind: one of 'port-city Rotterdam' and one of 'Rotterdam'. These so-called 'mental maps' reveal a person's point of view and perception of an area of

17 Han Meyer, Anne Loes Nillesen, and Wil Zonneveld, "Rotterdam: A City and a Mainport on the Edge of a Delta," European Planning Studies 20, no. 1 (January 2012): 71–94, https://doi.org/10.1080/09654313.2011.638498; Steenhuis Marinke et al., *The Port of Rotterdam: A World between City and Sea* (Rotterdam: NAi010 Publisher, 2015); Beatrice Moretti et al., "States of Co-Existence and Border Projects in Port Cities: Genoa and Rotterdam Compared," *Urban Design and Planning* 172, no. 5 (October 2019): 191–202, https://doi.org/10.1680/jurdp.18.00037; Jean-Lucien Bonillo, André Donzel, and Mario Fabre, eds., *Métropoles Portuaires en Europe: Barcelone, Gênes, Hambourg, Liverpool, Marseille, Rotterdam*, Les Cahiers de la Recherche Architecturale 30/31 (Marseille: Ed. Parenthèses, 1992).

interaction.[18] Every person draws a different mental map, related to what one remembers. Mental maps show elements that are present in the area, or are thought to be, in relation to each other. These elements may have been placed in a different location than where they are found in reality, while still having some sort of geographic resemblance to maps we all know: cartographic maps. The engagement of active participation of people experiencing the area afford instant knowledge as to respondent's understanding, and emphasize selection and organisation of memorable elements. No consult of information – but memory – is needed to reveals a personal, thus subjective, understanding of an area though memorable elements. The consequent graphic representations of that area may be self-discovery, yet mostly, like in this study, it eases the cognitive load of respondents to the researcher.[19] The elements drawn are easily identifiable and are easily grouped in to overall patterns, e.g. homogeographical or phenotypological. In an overlap of multiple mental maps, we can discover relations or intersections between people's understanding, memory, thus intersubjective images of an area. Whereas, in general, mental mapping measures geographic preferences among different social groups, particularly in relation to anthropological understanding diversity in society and cultures,[20] in this case, mental mapping tests a belief system. In that sense, the method of mental mapping reveals the "subjectively experienced problematic", which is "outside of scholastic disciplines", and particularly challenges disciple and mastering in education, similarly as the French anthropologist Pierre Bourdieu did.[21] The group of people in this experiment were all in university,[22] hence the group of participants has been well-delineated, while differences in terms of educational background has been clear too.[23] The applied approach of mental mapping introduces a creative approach, which challenges disciplinary cultures.

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18 Luc Pauwels, "An Integrated Conceptual and Methodological Framework for the Visual Study of Culture and Society," in *The SAGE Handbook of Visual Research Methods*, by Luc Pauwels and Dawn Mannay (Los Angeles, CA: SAGE Publications, 2020), 14–36, https://doi.org/10.4135/9781526417015.n2.

19 seq. George A. Miller, "The Magical Number Seven, plus or Minus Two: Some Limits on Our Capacity for Processing Information.," *Psychological Review* 63, no. 2 (March 1956): 81–97, https://doi.org/10.1037/h0043158; Lionel Standing, "Learning 10000 Pictures," *Quarterly Journal of Experimental Psychology* 25, no. 2 (May 1973): 207–22, https://doi.org/10.1080/14640747308400340.

20 Peter Gould and Rodney White, *Mental Maps*, Pelican Geography and Environmental Studies (Harmondsworth: Penguin, 1974); Roger M. Downs and David Stea, *Maps in Minds: Reflections on Cognitive Mapping* (New York: Harper & Row, 1977).

21 Pierre Bourdieu, *La Distinction. Critique Sociale du Jugement* (Paris: Les Editions de Minuit, 1979), 2, 52, 66.

22 seq. Les Solomon, "Mental Mapping: A Classroom Strategy," *Journal of Geography* 77, no. 2 (February 1978): 70–75, https://doi.org/10.1080/00221347808980076.

23 seq. Gould and White, *Mental Maps*, 51–53.

Testing Port|City Premises among Professionals-in-Training

Professionals have disciplined minds. The concepts, which they are using, are the result of training. And, what they have learned is based on generally accepted belief systems, stemming from ideology, perhaps more than from skills. So, every decision taken can be seen as ideology-based.[24] Discipline epistemologies explaining conceptions bring their own explanatory power to understandings of the disciplines, and with their specific analytic lens, partial apprehensions too.[25] Therefore, it's valuable to take a closer look at the professionals in training. What is in their minds? For the heuristic experiment, a sample group of sixty-five international graduate students responded. These students participated in a TUDelft graduate course and have an educational base in urban design, development, or closely related professions, but not (yet) in understanding port-cities.[26] Without conceptual explanations beforehand, these graduate students were asked: "draw the port-city of Rotterdam by mind". The drawings of the participants displayed a delineated variety of urban elements: Water, docks, cargo, moving loads, and ships. More so, this series of mental maps focus on whatever may be the port. It is remarkable that 'Rotterdam' is indicated as an independent distanced territory in nearly a quarter of the cases (23%), alike the cities of Schiedam, Vlaardingen, and Maassluis on the north bank (12-13%). Hook of Holland, under the administrative authority of Rotterdam, yet closer to the seaport is added most often (25%). Harbour villages, like Pernis and Rozenburg (5-7%), are mentioned similarly. In hindsight it makes sense that the drawings map port-activities and indicate cities apart. A 'port' just happens to be a place on the water in which ships shelter and dock to (un)load cargo and/or passengers. A 'harbor' is a sheltered place too, and in its nautical meaning it is a near-synonym for sheltered water, in which ships may dock, especially again for (un)loading. So, the above linguistic lemmas are conceptualized, connected to imaginable objects and drawn in accordance to their connotation. Apparently in a 'port-city', the adjective 'port' modifies the meaning of 'city' in such an extent that this echoes in the minds. Objects associated with the port form what we call a 'mental map'. In general, putting such a map on paper displays a person's subconscious representation of an area, and although each map is subjective, a representative sample

24 Jeff Schmidt, *Disciplined Minds: A Critical Look at Salaried Professionals and the Soul-Battering System That Shapes Their Lives* (Lanham: Rowman & Littlefield Publishers, 2001), 15, 37-38, et seq.

25 Joëlle Fanghanel, "The Role of Ideology in Shaping Academics' Conceptions of Their Discipline," *Teaching in Higher Education* 14, no. 5 (2009): 565–77, https://doi.org/10.1080/13562510903186790.

26 The graduate students were registered in MSc-tracks on Urbanism, Architecture, Building Engineering, Housing, Landscape Architecture, Transport, Infrastructure and Logistics, Policy, Complex Systems Engineering and Management, and Media Studies. They have drawn the maps in 10 minutes end of April 2020, before they started the course on 'People, Movement, and Public Space', run by the author to investigate port-city Rotterdam. This method is applied and evaluated in the same course since 2014 to investigate different cities.

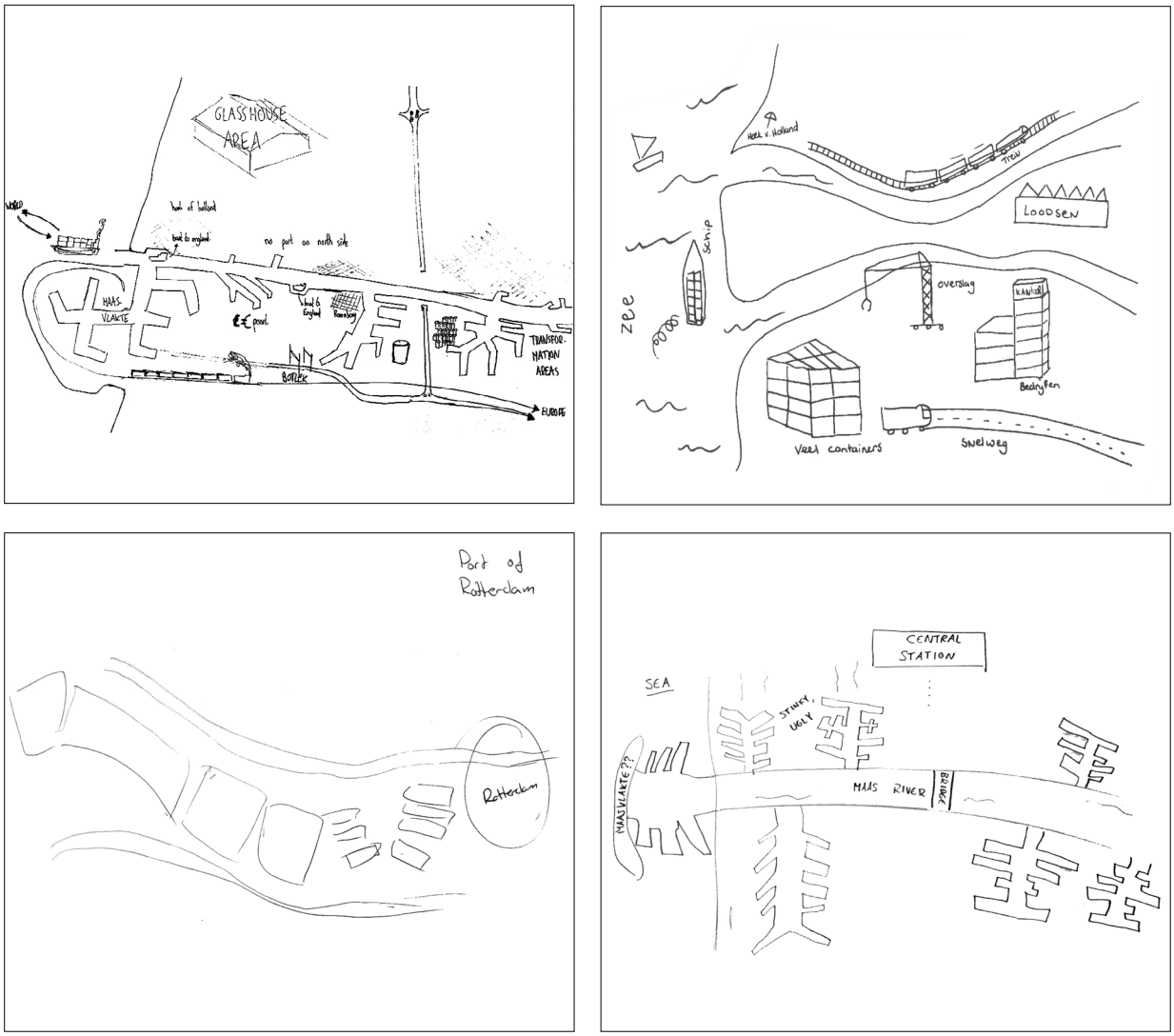

FIG. 3 Mental Maps of Port-City Rotterdam, examples drawn by students of Urbanism (a), Transport, Infrastructure and Logistics (c), Architecture (b), and Media Studies (d), 2020, credits trough anonymized responses in the graduate course on People, Movement and Public Space by Maurice Harteveld.

helps to identify areas and people's affiliation to these areas. Yet, mental maps with a strong emphasis on ports – rather than of port-cities as a whole – seem very limited in their scope. In general, participants use to approach ports as a vague relatively large section of the city: Sixty participants handed-in a mental map of the port-city Rotterdam, some of which a mind map with just words or a kind of assembled image impression. All with the emphasis on the port: 80% draw the river Maas,[27] 65% of them add docks, and 47% the sea shore. Following the conceptual urban design perspective on mental maps of Kevin Lynch,[28] we may label the port or any harbor area a 'district' in our mental maps, with the river as its water 'edge' and perhaps as predetermined 'path' to reach the sea, a waterway. It is alike all those areas we know, but not know exactly. Here, 'landmarks' and 'nodes', defined by him too, are rare **[Fig. 3]**.

27 This includes the New Waterway at the mouth of the river Maas.

28 Kevin Lynch, *The Image of the City* (Cambridge, Mass.: MIT Press, 1960).

In the Rotterdam sample, sub-territories are delineated mostly by adding words. The number of places and times extra info is provided varies a lot. The intercontinental relations seem to matter: Europe is written down (14%), as is United Kingdom/England, including the ferry (12%). Once or twice participants add Germany, Belgium and Norway. Details lack. The indication of the harbor areas is exemplary on the local levels. Of all, 'Maasvlakte' is added most frequently (50%). The Dutch sea port formed by an extensive area of reclaimed land is also included by foreign participants. Other labels are nearly always added by Dutch. The neighboring large harbor area 'Europoort' is indicated in words seven times (12%), whereas the three harbor areas closer to the city center (Rijnhaven, Maashaven, Waalhaven) are named in different combinations just twice each (3%) and references to 'old harbors' or 'the old port-city' are made only in three maps (5%). This does not mean that people don't know these latter harbor areas. Again, docks are drawn. Yet, as these harbors are not anymore, or to lesser degree, used for docking ships, participants, also from abroad, see these areas in a different way. In their mental maps, we recognize these areas more often as redeveloped piers: Kop van Zuid (13%) Katendrecht (7%), M4H makers district (7%) and RDM terrain (3%). The nearby Erasmus Bridge is quite often drawn as a landmark or place in the midst of a city (20%). We see more accurate shapes representing the piers with more detail and some public buildings are indicated here (like Hotel New York and Fenix Loods, both 7%). This set of mental maps unfolds detailed images of the port-city near the center.

Occasionally we see some sort of detail also in what is considered as the port, like the storm surge barriers, mostly the Maeslantkering (13%). Containers (18%) and oil drums (27%) are pictured too. Following Lynch, they may be harbor 'landmarks' or if coming in groupings as 'nodes', but they lack any precision and context. They more seem symbols replacing words. As such they are 'characterizations' of certain area. Next to this, another 40% of maps indicate industrial areas, or depict refineries and pipes. The sum of oil-related symbols used stands in strong contrast to just 8% representation of the more-recently developed wind farms and turbines. Same can be stated for the old-school cranes which are drafted (13%). Although they resemble mostly construction cranes rather than those truly used in the harbor, they don't look like the panamax cranes in the non-human automated port terminals of Rotterdam seems. Perhaps in a few cases. (0-3%). The terminal areas themselves are absent in the maps. Admittedly they are only a few years old, mostly out of view from the public roads, and not yet so often used as an illustration of the port area. Anyone remembers deck or bulk cranes from paintings and photographs. The lack of detail in outlined harbor areas correlates with lacking detail in the network of public space. A panamax or wind turbine is big enough to see when people experience the port area. But, most people are elsewhere. Streets seldom are outlined in the harbor areas. Instead only

highways and main roads (30%), railways for trains (18%) and metro (7%) are put on paper schematically. Some trucks and cargo trains are used as characterization. Add to this ships, many times drawn with containers on board, and/or a few vessels (27%).

As much as 'port' remains dominant in the minds of people, and mental maps remain predominantly vague, we can conclude that basically port-cities relate to places where goods arrive or depart. Details are repeatedly mere characterizations, determining distinguishing features of harbor areas. With this, the image remains somewhat ancestral and this may stay unless people are present in these areas or inside pictures are communicated widely.

Testing Port-City Counter Premises among Professionals-in-Training

Given the dominance of the port and port-related phenomena in the above set of mental maps, one may wonder what would be the map of a lived city. Following the above, mental maps are more accurate when illuminating inner-cities and other civic areas. Everyday life gives people daily updates in such places. The same group of graduate students was also asked to "draw Rotterdam by mind" before challenging them to draw the 'port-city'. In this question, 'port-city' was explicitly left out. This set of mental maps is richer in the kind of objects drawn indeed, though still they do relate to a subconscious image of port-cities. Fundamentally, it makes sense that this question generates more info. The configurations of the networks of public spaces in the civic areas differ from port infrastructure. Block sizes and private premises are much smaller and street and intersection density much higher. In this set of mental maps, we see areas, which are clearly more familiar for the participants. Now most approach Rotterdam as a relatively detailed known territory. All participants handed-in a mental map of Rotterdam, some of which again a mind map or assembled image impression. In comparison with the other set of maps, a few more participants draw the river Maas (+5%), less participants, but still 40%, adds docks (-25%) yet now never with its name, and just 9% includes the sea shore (-38%). In difference, the Schie (9%) and Rotte (6%) are reoccuring, and the same group of people now detail the Maas with its island Noordereiland (28%), whereas only twice the Maasvlakte is named. In addition too, a wide variety of neighborhoods and neighboring cities have been named both on the north and south bank. Feyenoord (14%), Charlois (8%), Kralingen (12%) and the cities of Schiedam (23%) and Delft (9%) are named most often. Again, we recognize Kop van Zuid, now even in 46% of the cases (+31%), as well as the other redeveloped harbor areas. Maps outline Katendrecht (+2%), M4H makers district (+4%) and once RDM terrain. One adds Lloyd Quatre. Symbolic characterizations referring to port activities are there as well; 17% industry (-7%), 18% ships and vessels

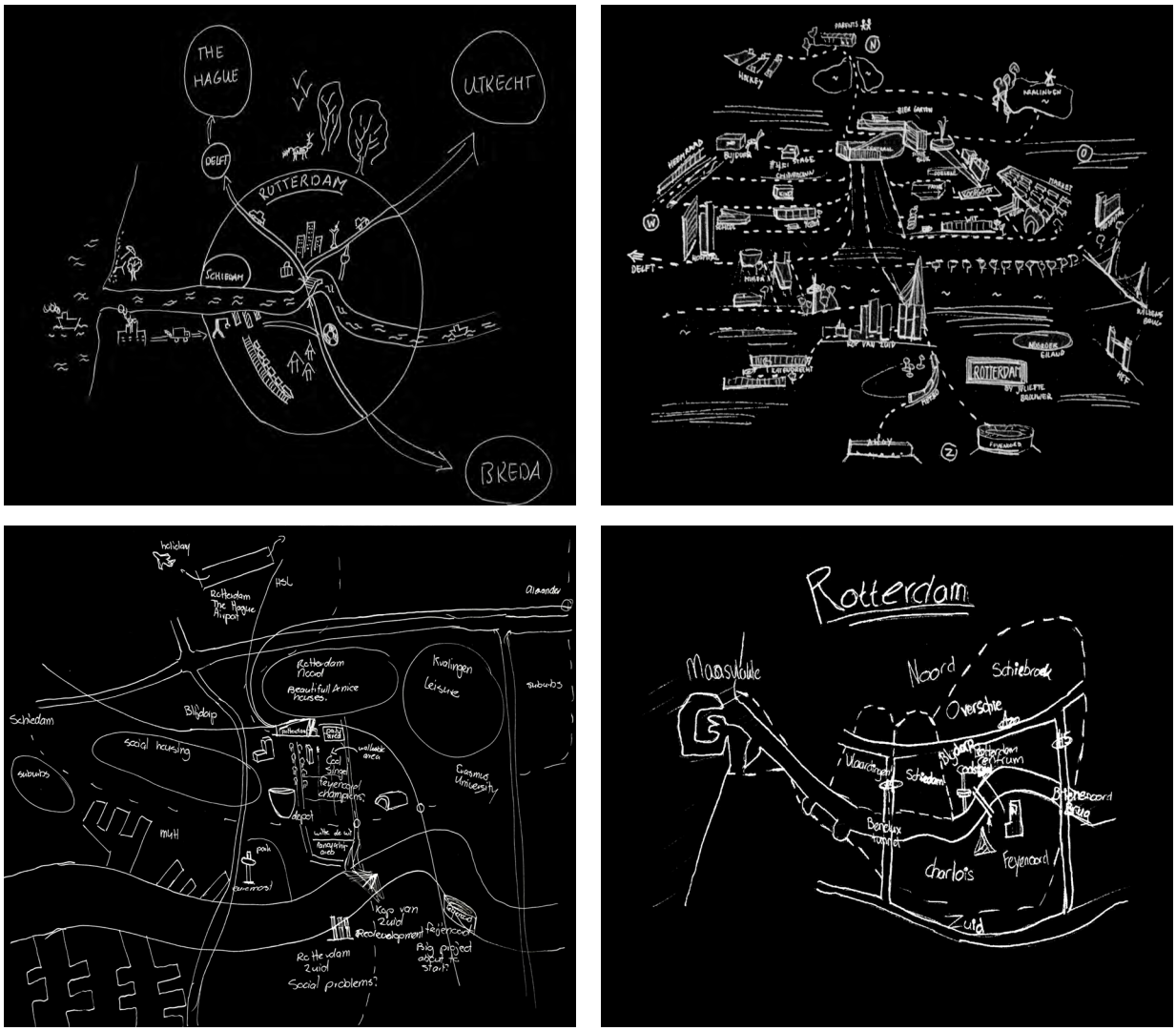

FIG. 4 Mental Maps of Rotterdam, examples drawn by students of Transport, Infrastructure and Logistics (a), Urbanism (b), Architecture (c) and Complex Systems Engineering and Management (d), 2020, credits trough anonymized responses in the graduate course on People, Movement and Public Space by Maurice Harteveld.

(-8%), 5% cranes (-12%) and just one time each in this case; containers, refinery, oil drums, and a wind turbine. No advanced port cranes. Clearly, the memory on port activities is utilized less when making decisions in drawing the mental map of Rotterdam [Fig. 4].

Focus turn to the heart of the lived city. We see much more often the Erasmus Bridge (82%), now being supported by an outdoor street networks in at least half of the cases (52%). Central station is indicated, and mostly quite accurate (65%), rail networks (37%), highways/main roads (34%), the airport, other stations, passenger trains, metro (8-14%). We can even indicate specific public spaces within the maps. Participants have included for instance the city's spine Coolsingel (22%), a filled-up canalized moat and arterial road, or the outdoor market Binnerotte (5%), filled-up outlet of the Rotte, both recently redesigned. They also picture the nearby multi-level shopping street Koopgoot (20%) and the pedestrian mall Lijnbaan (8%), as well as the indoor shopping center Zuidplein (6%), central in the urban fabric south of the river. A refined network used

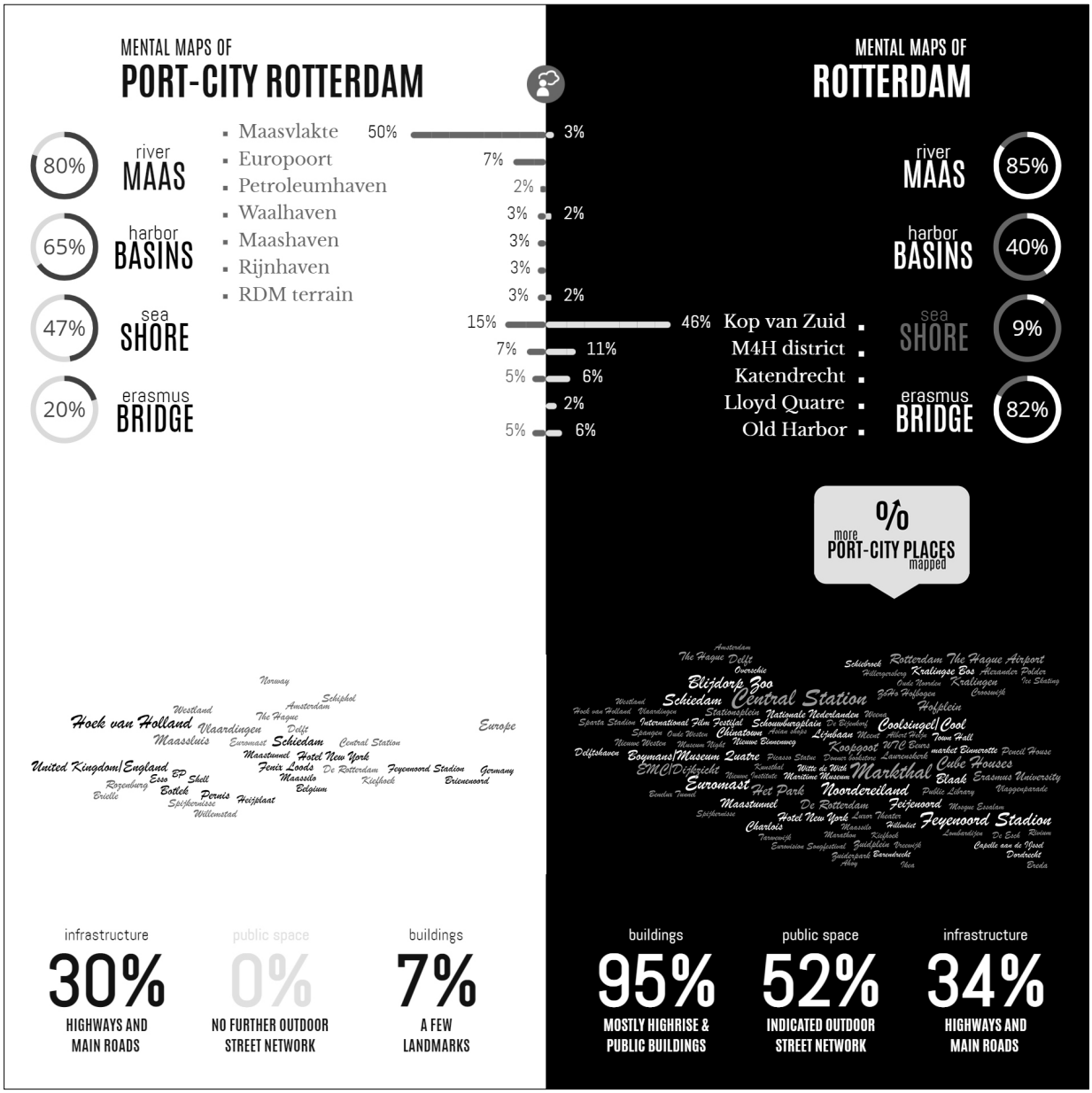

FIG. 5 Infographic of the Comparative Analyses on the two Sets of Mental Maps, credits Maurice Harteveld.

by people goes along with more insight in the urban fabric. A little more than 95% of the mental maps of Rotterdam indicate buildings. Half of the maps includes high-rise (50%), of which quite a fair number is indicated accurately in the CBD areas or representing headquarters with logos. Tourist attractions are present, like the colossal archwise structure of the Markthal (40%), the observation tower Euromast (34%), and peculiar Cube houses (26%). Many people from abroad map these. Even international festivals are mentioned (9%). We can also recognize drawings of several museums, nameworthy within the scope of study, are the Maritime Museum (3%) and the Museum Boijmans Van Beuningen (14%), bearing the name of one founder, who earned his reputation through the economic transformation of the Rotterdam port, but few may know. The town hall is drawn only three times. This building implicitly presents many port-city signs carried in its design (e.g. sculptures, portraits, emblems

on the facades, and allegorical canvases inside make reference to the port-city). Many more public spaces and buildings are sketched, like a park, square, public library, theatre, warehouse, store, supermarket and shops, but these must be present in mental maps of many other cities too.

The level of detail in mental maps of the lived city is higher as expected. On the base of this set, we can conclude that port-cities relate to places where people arrive or depart, next to goods, *and* where the world comes together. Public spaces in the port-city of Rotterdam showcase interconnections around the world: global businesses, multinationals, international brands, universal amenities, cosmopolitan locations, world event stages and festival areas, tourist magnets, ex-pads towers, etc. Occasionally, we are able to recognize symbols of houses and humans as apparent general characterizations for certain areas. Ethnographically, a minor group mentions Chinatown or Asian shops (9%), the presence of inhabitants with different cultural backgrounds (6%), and anthropologically related; diversity and variety of lifestyles in general (7%). Respectively drawn once and twice; the Mosque Essalam, biggest in the Netherlands, and the 'Vlaggenparade', including all flags of the UN. These precisions echo through, the observation that port-cities relate to places where cultures live together.

Mental Layers and the Union of Port and City

Comparing the two sets, goes along with understanding what has been drawn. What attracts attention are the levels of detail. On the one hand, the set of mental maps of Port-City Rotterdam lacks detailed maps. Immense harbor areas often not detailed in the mental maps and placing imaginary elements instead make perfectly sense. The unobserved is never taken into account, whereas objects generally associated to ports are. It is a duality which is recognized since the birth of an experimentalist search for psychophysical correlations.[29] The limited amount of information in these mental maps can be explained fairly simple. Mental maps are always based upon our experiences and upon information we have gathered over time. When we know less, we draw less.[30] In the Rotterdam case, no participant knows Restaurant De Punt in the Europoort, or snackbar Smickel-Inn at the Maasvlakte. People only have physically large features in mind. These could be seen from a distance. Public meeting places presume presence, but there not. So, people add objects they presume are there. This is connected to the lack of public accessibility of the port area itself. Public space is rare, often fenced and walled and thus the public expanse of the harbor areas is limited. Since the general public cannot access most of its maritime and industrial landscapes, few people

29 Edwin G. Boring, *The Physical Dimensions of Consciousness* (New York; London: The Century Co., 1933).

30 David V. Canter, *The Psychology of Place* (London: The Architectural Press, 1977).

can map the exact layout of the port area from their memory. In addition, the lack of detail in the maps also relates to the speed visitors have. Public spaces in the harbor area are car-dominant, functional port infrastructure for transport and distribution. An old urban design lesson teaches that we see less if we move fast.[31] In the civic areas, people experience the port-city very different. People move with different paces. Paths are different, perspectives are different, and perceptions are different. We can be informed in various ways. Very fundamental in environmental psychology is the difference between people who know the city in mediated ways and those who reside there.[32] We may know the city by heart, or through a novel or other books. We may recall paintings or online images. We may be informed through a wide variety of social media, films and music. One the other hand, the set of mental maps of Rotterdam introduces a lot of detail, and maps reveal many elements related to the port-city: buildings related to long established migrant relations, objects related to global capital, and nodes and lines related to distribution. From this perspective, the interrelation between port and city remains manifest. Tangible and intangible signs and symbols, which do relate to the basic flows of goods, hence people and ideas, underpin the culture and nature of a port-city. Despite a multiplicity of differences between individuals, their mental maps, the set of drawings show many more elements related to port-cities than the ones introduced before. Remarkably, if the question is less biased, the amount of information drawn in mental maps increases.

Comparing the two sets against the generally accepted port-city narrative uncovers another remarkable observation. The responses to 'draw port-city Rotterdam' displays a scholastic interpretation of port-city, which echoes through the port|city model and cultured interdisciplinary viewpoints on this. Although, diversity is displayed among the respondents, foremost this set of results reveals a discourse of beliefs and practices. Already in the classroom, there seems a dominant definition of 'port-city' as legitimate acculturated understanding of what is a port-city. This contrasts with the responses to 'draw Rotterdam' (without adding port-city). This set devalues scholarly understanding in favor of direct experience and simple delight. It offers a basis for opposing the established model. Educational background did not effect this. By overlapping maps, people's personal perspectives are intersected and as such generate a supplementary model by-passing the presumed disunion of port and city. In this experiment, a majority of elements, ranging from indexed sub-territories, public spaces and built structures to symbolic characterizations, relate to the port-city of Rotterdam, no matter if explicitly asked to draw this. More so, the rich intersubjective mental layer which go along with not

31 Donald Appleyard, Kevin Lynch, and John R. Myer, *The View from the Road* (Cambridge, MA: M.I.T. Press, 1964); Robert Venturi, Denise Scott Brown, and Steven Izenour, *Learning from Las Vegas* (Cambridge, Mass.: M.I.T. Press, 1972).

32 Canter, *The Psychology of Place*.

asking to draw the 'port-city' produces both the obvious as well as the associative or even the invisible union of port and city. This completes and rectifies the generally accepted ontological port|city model. In this way, he method of mental mapping helps to make conceptions in the minds of people explicit, before applying a concept which is a precooked model. The method of mental mapping has been able to inform urban design before, both in academia and practice, and from this professional point of view, they can connect histories of cities to future making again and with more care.[33] The approach serves beneficially the continuation of contemporary participatory approaches in urban planning and policies for development.[34] Both can affect the further development of port-cities on all levels, ranging for example from metropolitan governance to the design of public space.

To conclude, first, the method of mental mapping reveals subconscious interrelations between port and city when participants are asked to draw a map of a port-city by mind, as long as the researcher is not explicating that the city in question could be typified as such. A considerable share of the elements drawn are expected to represent tangible and intangible signs and symbols relating to characteristics of a port-city. Analytically indexing those will bring forth a interconnected port-city rather than a dived one. Such study will help urban designers and others to identify port-cities as 'cities', and as such to overcome the conceptual dichotomy of port and city which generally has led them to reproduce this in their practice. Awareness rises when comparing such mental maps with maps drawn of port-cities, which the researcher did typified as such to the respondents. Second, the method of mental mapping tests our premises. It takes into account that what is drawn is "rooted and influenced by cultural frameworks of experiences", and what is discovered in the maps reflects "the biases and values of their beholders."[35] By introducing the method in an early stage of professional training to students, who are still learning to identify the various frameworks and dimensions of urban culture, future professional port-city practices may seek connections rather than disconnections.

Still, like any experiment, a follow-up with different participant groups is needed. Then, at a certain point of saturation, new maps may not be surprising anymore. The undrawn is always out there. The intent cannot be

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33 e.g. J. C. Moughtin et al., *Urban Design: Method and Techniques* (Oxford: Architectural Press, 2003); Matthew Carmona et al., *Public Places Urban Spaces: The Dimensions of Urban Design* (Oxford: Architectural Press, 2003); Michael Larice and Elizabeth Macdonald, eds., *The Urban Design Reader*, 2nd Edition (New York: Routledge, 2013), https://doi.org/10.4324/9780203094235; Mark Sheppard, *Essentials of Urban Design* (Clayton South: CSIRO Publishing, 2015), https://doi.org/10.1071/9780643108776.

34 e.g. Tal Berman, *Public Participation as a Tool for Integrating Local Knowledge into Spatial Planning* (Cham: Springer International Publishing, 2017), https://doi.org/10.1007/978-3-319-48063-3; Sarah Banks et al., eds., *Managing Community Practice* (Second Edition): *Principles, Policies and Programmes*, 2nd edition (Bristol: Policy Press, 2013).

35 Vera John-Steiner, *Notebooks of the Mind: Explorations of Thinking* (Albuquerque: The University of New Mexico Press, 1985); Gould and White, Mental Maps.

complete. However, in discovering maritime mindsets, we can already look beyond the water, docks, cargo, moving loads, and ships in the future. More so, the awareness of the (inter)subjectively experienced contributes to the sociology of education on port-cities, and generates desire for an interdisciplinary port-city practice based upon an open mind.

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