ACTIVE URBAN DWELLING:

VARIATIONS OF BODY AND SPACE FOR IMPROVED WELL-BEING

Bianca Gabrielle Verwaayen
Master of Architecture Thesis
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ACTIVE URBAN DWELLING:
VARIATIONS OF BODY AND SPACE FOR IMPROVED WELL-BEING

By

Bianca Gabrielle Verwaayen
B.Arch.Sc, Ryerson University, 2018

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Ryerson University

ABSTRACT

Designed for efficiency and economy, the design of apartment housing in Toronto has become repetitive, often leading our lived environments to lack spatial variation and limit how we use, and move, in space. This impairs the well-being of our minds and bodies as we slip into the 'automatic' -- increasing the risks of declines in our cognitive functioning, physical abilities, and life span. This thesis proposes and tests a new conception of mid-rise urban dwelling that is based around active lifestyles through physical and social engagement. Various scales are considered: that of private dwelling, shared clusters of spaces, shared building sites, and context and site as it integrates with the city. Findings of this thesis highlight that urban living can promote well-being through the use of affordances, proximities, and public and private gradients which create interstitial spaces between housing and the city.

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TABLE OF CONTENTS

Author's Declaration.....	ii
Abstract.....	iii
Acknowledgments.....	iv
List of Figures.....	viii-xv

A CASE FOR MOVEMENT AND VARIATION

Introduction.....	01-06
01 Background and Context.....	08-20
a. activity and well-being.....	08-11
b. issues with current housing.....	11-15
c. poor active design guidelines.....	16-17
d. introduction to affordances.....	17-19
e. thinking differently about housing.....	19-20

OUR CURRENT CONTEXT

02 Housing In Toronto // where are we now?.....	23-30
a. housing crisis.....	23-29
b. conditioned practices and project site.....	29-30
03 Historical Context // how did we get here?.....	31-37
a. apartment housing.....	31-32
b. toronto's condo culture.....	32-33
c. the missing middle crisis.....	33-37

RESEARCH THEMES

04 Research.....	39-49
a. affordance theory and application.....	39-42
i. theory.....	39-40
ii. application.....	40-42
b. architecture of movement, change and variety.....	42-43
i. Bernard Tschumi.....	42-43
ii. Greg Lynn.....	4

c. active living for well-being.....	43-48
i. active design.....	43-45
ii. movement.....	45
iii. social well-being.....	46
iv. shared living - mending physical and social well-being.....	46-48

PROCESS AND DEVELOPMENT

05 Design Research and Methodology.....	51-67
a. design research as a method.....	51
b. variety: flexibility for movement and space.....	51-57
c. form: new behaviour and experience.....	58-61
d. new organizations and relationships: qualities, organizations and amenity.....	61-66
e. informing the project scales.....	66-67

DESIGN PROJECT

06 Design.....	69
07 Site Investigation.....	70-78
a. typology.....	70
b. design strategies.....	70
c. background and history.....	70-71
d. site analysis.....	72-73
e. response to context.....	74-78
08 Design Project.....	79-157
a. project description and scope.....	79-81
b. project scales.....	82-83
c. private dwelling scale.....	84-104
d. shared dwelling scale.....	105-115
e. neighbourhood scale.....	116-135
f. building scale, shared.....	136-143
g. site scale, public.....	144-157

09 Reflection.....	158-159
a. universal accessibility.....	158-159
b. providing options.....	159
c. shared space.....	159

CONCLUSION

10 Conclusion.....	161-162
--------------------	---------

APPENDIX

Design Research.....	164-198
a. Habit(at).....	165-167
b. Dis(obedient).....	168-170
c. Un(conventional) home.....	171-173
d. Dwelling Study 1.....	174-179
e. Dwelling Study 2.....	180-191
f. Fragment: Private to Communal.....	192-194
g. Movements Summary.....	195
Reflection: Design Research Expectations Versus Outcomes.....	196-198
Works Cited.....	199-201
Bibliography.....	202-206
Glossary.....	207-209

LIST OF FIGURES

INTRODUCTION

- Figure 1:** The End of Sitting: possibilities of radical change for the working environment 03
Source: Gallery of The End of Sitting / RAAAF - 11. (n.d.). Retrieved from <https://www.archdaily.com/574795/the-end-of-sitting-raaaf/547fa5d5e58ece4f800000be-detail>
- Figure 2:** Bruno Munari's Seeking Comfort in an Uncomfortable Chair (1944): the 'material thoughts', of the chair, subverting the armchair's canonical grip over the body 05
Source: Ong, I. (2019, February 4). Bad (Habit)at: Architecture as Action Forms. Retrieved from <http://www.interactivearchitecture.org/bad-habitat-architecture-as-action-forms.html?fbclid=IwAR2Twaz6Fw7zGbWmISzJpz8Kj7P21HqtD-Au3bHWQjUas4FQr1Vm1PdKN5c>

SECTION 1: A CASE FOR MOVEMENT AND VARIATION

- Figure 3:** Digital Conveniences: Uber Eats 08
Source: Houck, B., & DeJesus, E. (2019, July 2). Uber Eats Now Wants People to Dine In at Restaurants. Retrieved from <https://www.eater.com/2019/7/2/20678882/uber-eats-tests-dine-in-option>
- Figure 4:** Working from Home 08
Source: Murtaugh, T. (2019, December 12). The Best Non-Scammy Work-From-Home Jobs. Retrieved from <https://www.womansday.com/life/work-money/g934/best-work-at-home-jobs/>
- Figure 5:** Vehicle Transportation 08
Source: (n.d.). Retrieved from <https://www.carcitycanada.ca/>
- Figure 6:** Activity and Cognitive Function 09
Source: Menu. (n.d.). Retrieved from <http://labs.ica hn.mssm.edu/pasinetti-lab/alzheimers-disease/>
- Figure 7:** Fine Motor Skills 09
Source: Developing Motor Skills. (n.d.). Retrieved from <https://www.parents.com/toddlers-preschoolers/development/physical/child-developing-motor-skills/>
- Figure 8:** Gross Motor Skills 09
Source: How to raise active kids. (2018, September 26). Retrieved from <https://www.summithealth.org/how-raise-active-kids>
- Figure 9:** Movements 10
Source: By Author
- Figure 10:** Apartment Housing Units 12
Source: By Author
- Figure 11:** Analysis of Typical Toronto Apartments 12
Source: By Author
- Figure 12:** Reinscribe Movement of Bodies into Space Through Hybridization of Program in Plan and Section: Inspired by Tschumi's "New Conception of Architecture" 13
Source: By Author

Figure 13: Smoothing and Pliancy Concept Diagrams <i>Source: By Author</i>	14
Figure 14: Environment as Extension of the Body <i>Source: By Author</i>	14
Figure 15: Active Design Nudge through Signage <i>Source: makes-us-healthier-video.html</i>	15
Figure 16: Movement Section on WELL Standard's Website <i>Source: Well Standard. (n.d.). MOVEMENT. Retrieved from https://v2.wellcertified.com/v/en/movement</i>	16
Figure 17: Breaking Habits, RAAAF Architects, Netherlands <i>Source: Walsh, N. P. (2017, February 20). RAAAF is Breaking Habits With a Vision of a Home Without Chairs. Retrieved from https://www.archdaily.com/805595/raaaf-is-breaking-habits-with-a-vision-of-a-home-without-chairs</i>	18

SECTION 2: CURRENT CONTEXT

Figure 18: Poor Architectural Quality: Unambitious Exterior: Unused Balconies <i>Source: Kalinowski, T. (2018, August 19). All those unused condo balconies? Most of us won't buy without them. Retrieved from https://www.thestar.com/business/2018/08/19/all-those-unused-condo-balconies-most-of-us-wont-buy-without-them.html</i>	23
Figure 19: Poor Architectural Quality: Bachelor Apartment Living Space & Kitchen <i>Source: Photography by Author</i>	23
Figure 20: Poor Architectural Quality: Interior: Small Spaces Trend <i>Source: (2019, March 26). Big Trends in Toronto Condos with Small Spaces. Retrieved from https://condos.ca/blog/big-trends-in-toronto-condos-with-small-spaces</i>	24
Figure 21: Change in Toronto Population Density: 1970 vs 2016 <i>Source: Wang, J., & Larocque, H. (2019, February 11). This fact sheet compares population density for the Toronto and Vancouver census metropolitan areas (CMAs) in 1971 and 2016. It includes maps showing changes in the extent and density of populated areas on the periphery of these areas, as well as changes in population density within previously settled areas. Retrieved from https://www150.statcan.gc.ca/n1/pub/16-508-x/16-508-x2019001-eng.htm</i>	24
Figure 22: 1 Bedroom, Aura, Toronto, 532 ft ² <i>Source: Shahsavar, H. R. (2014, April 13). AURA AT COLLEGE PARK , 386 YONGE ST CONDO AURA CONDOS TORONTO. Retrieved from https://www.slideshare.net/Steve0011/aura-lower-floors</i>	26
Figure 23: 2 Bedroom, Great Gulf, Monde Condos, Toronto, 938 ft ² <i>Source: https://www.google.com/url?sa=i&source=images&cd=&ved=2ahUKEwiQi7qt-pzkAhWHY98KHRB7AbYQjB16BAGBEAM&url=http%3A%2F%2Fwww.listofcondo.com%2FMonde_Condos%2Fpage_2443300.html&psig=AOvVaw3H4BATcKL3ouh4SsU2dxRH&ust=1566785867996780 aura-lowerfloors</i>	26

Figure 24: 3 Bedroom, Alter Condos, Toronto, 1285 ft ² Source: (n.d.). <i>Prices & Floorplans - Alter</i> . Retrieved from https://www.tridel.com/alter/prices-floorplans/#/suite/detail/2148,Toronto,3 Bedrooms ,3G	26
Figure 25: Functions of the vernacular condo/apartment: 1 bedroom, Aura, Toronto Source: Shahsavar, H. R. (2014, April 13). <i>AURA AT COLLEGE PARK , 386 YONGE ST CONDO AURA CONDOS TORONTO</i> . Retrieved from https://www.slideshare.net/Steve0011/aura-lower floors	27
Figure 26: Gehl's Observations on Distance, Perception and Thresholds Source: Gehl, J., (2010). <i>Cities for People</i> . Island Press.	28
Figure 27: Proposed Tower 33 Sherbourne Street Toronto, ON Source: 33 Sherbourne: <i>UrbanToronto</i> . (n.d.). Retrieved from https://urbantoronto.ca/database/projects/33-sherbourne	30
Figure 28.1-28.2: Proposed Tower Site in Relation to Design Project Site Source: Retrieved from https://www.google.com/maps/place/33 Sherbourne St, Toronto, ON M5A 2P5/@43.6508398,-79.369926,651m/data=!3m2!1e3!4b1!4m5!3m4!1s0x89d4b3a681663e7:0xbf4e3d6482ae7a9b!8m2!3d43.6508398!4d-79.3677373 .	30
Figure 29: Allan Gardens Bachelor Apartments [from “Midmaples Group” and “Allan Gardens”, promotional booklet (1914) in Dinnick Papers, MU 904, Archives of Ontario] Source: Dennis, R. L. (1998, January 1). <i>Figure 3 from Apartment Housing in Canadian Cities, 1900-1940: Semantic Scholar</i> . Retrieved from https://www.semanticscholar.org/paper/Apartment-Housing-in-Canadian-Cities,-1900-1940-Dennis/d41e5eaca3a778b93e38f1135a536d78392d6fb6/figure/4	31
Figure 30: Kingsley Mansions, erected 1912, north-east corner of King Street West and Jameson Avenue, Toronto [R. Dennis, 1988] Source: Dennis, R. L. (1998, January 1). <i>Figure 3 from Apartment Housing in Canadian Cities, 1900-1940: Semantic Scholar</i> . Retrieved from https://www.semanticscholar.org/paper/Apartment-Housing-in-Canadian-Cities,-1900-1940-Dennis/d41e5eaca3a778b93e38f1135a536d78392d6fb6/figure/4	31
Figure 31: Toronto's Dominant form of Apartment Housing Source: <i>Gallery of Ubiquity and Uniformity: Why Toronto's Condominiums All Look the Same - 1</i> . (n.d.). Retrieved from https://www.archdaily.com/802984/ubiquity-and-uniformity-why-torontos-condominiums-all-look-the-same/586ec27fe58ece3daa000014-ubiquity-and-uniformity-why-torontos-condominiums-all-look-the-same-image	32
Figure 32: Missing Middle, Image via City of Edmonton/Green Space Alliance Source: <i>Evolving Infill Project Approaches Final Stages in 2018: SkyriseEdmonton</i> . (n.d.). Retrieved from https://edmonton.skyrisecities.com/news/2017/12/evolving-infill-project-approaches-final-stages-2018	34
Figure 33: Scale: People, Trees, and Building Height Source: <i>By Author</i>	35
Figure 34: Scale: Heights of Front Doors at Low-Rise Residential Areas Versus High-Rise Highly-Urban Areas Source: <i>By Author</i>	36

Figure 35: Scale: Heights of Trees at Low-Rise Residential Areas Versus High-Rise Highly-Urban Areas Source: By Author	37
--	----

SECTION 3: RESEARCH THEMES AND METHODOLOGY

Figure 36: Flexible Chair Affords Opportunity For Variety Of Sitting Positions And The Act Of Laying Source: By Author	39
Figure 37: Perceived Affordance Of Pushing And Pulling: Relationship Of Body To Place Or Object Source: By Author	40
Figure 38: MUNARI Routes in Midair, Francesco Librizzi Studio (2013) Source: Ong, I. (2019, February 4). <i>Bad (Habit)at: Architecture as Action Forms</i> . Retrieved from http://www.interactivearchitecture.org/bad-habitat-architecture-as-action-forms.html	41
Figure 39: Maquettes Of Bernard Tschumi's Parc De La Villette Folies: Breaking Architectural Rigidity, Offering New Interactions Source: Fabrizi, M. (2019, January 23). <i>Autonomous Neutral Objects: The Combinatorial Models of La...</i> Retrieved from http://socks-studio.com/2014/12/29/the-combinatorial-models-of-the-folies/	42
Figure 40: Proposed Plan, Gayle Nicholl Source: OCAD University, Georgia Institute of Technology, NYC Department of Health and Mental Hygiene (2013). <i>Active Design Supplement: Affordable Designs for Affordable Housing</i> . PDF	44
Figure 41: Proposed Challenge Path, Gayle Nicholl Source: OCAD University, Georgia Institute of Technology, NYC Department of Health and Mental Hygiene (2013). <i>Active Design Supplement: Affordable Designs for Affordable Housing</i> . PDF	44
Figure 42: Illustrations And Model Photographs Of Friedrich's Thesis Project On Architecture And Healthy Living, Lauren Friedrich Source: Pazzanese, C. (2016, August 5). <i>Design for movement</i> . Retrieved from https://news.harvard.edu/gazette/story/2016/08/design-for-movement/	45
Figure 43: Marmalade Lane Has A Central Common House, Where Members Of The Community Can Eat And Socialise, As Well As Other Communal Spaces Such As A Gym, Laundry, Meeting Rooms And A Garden Source: Coldwell, W. (2019, September 3). <i>Co-living: the end of urban loneliness – or cynical corporate dorms?</i> Retrieved from https://www.theguardian.com/cities/2019/sep/03/co-living-the-end-of-urban-loneliness-or-cynical-corporate-dormitories	47
Figure 44: Example Shared Common Space Between Private Dwellings Among Larger Group Of People Source: Gallery of UN-Habitat Announces Winners of Mass Housing Competition - 2. (n.d.). Retrieved from https://www.archdaily.com/500053/un-habitat-announces-winners-of-mass-housing-competition/53590e71c07a801ac4000004-un-habitat-announces-winners-of-mass-housing-competition-image	47
Figure 45: Example Immediate Interior Shared Common Space Among Small Group Of People Source: <i>Shared Micro-Living Apartment is Surprisingly Inviting</i> . (n.d.). Retrieved from https://dornob.com/shared-micro-living-apartment-is-surprisingly-inviting/	47

SECTION 4: PROCESS AND DEVELOPMENT

Figure 46: Ryerson University's Student Learning Centre Entrance <i>Source: snohetta. (n.d.). Ryerson University Student Learning Centre. Retrieved from https://snohetta.com/project/250-ryerson-university-student-learning-centre</i>	52
Figure 47: Ryerson University Student Learning Centre from Street <i>Source: snohetta. (n.d.). Ryerson University Student Learning Centre. Retrieved from https://snohetta.com/project/250-ryerson-university-student-learning-centre</i>	52
Figure 48: Interweaving Spaces <i>Source: By Author</i>	53
Figure 49: Typical Apartment Organization <i>Source: By Author</i>	53
Figure 50: New Form of Dwelling: Interweaving <i>Source: By Author</i>	53
Figure 51: Bioscleave Interior 1 <i>Source: Bioscleave House (Lifespan Extending Villa). Retrieved from http://www.reversibledestiny.org/architecture/bioscleave-house-lifespan-extending-villa.</i>	54
Figure 52: Bioscleave Interior 2 <i>Source: a house that claims to stop ageing and death is on the market for \$1,495,000. (2019, December 11). Retrieved from https://www.designboom.com/architecture/bioscleave-house-arakawa-gins-east-hamptons-on-sale-02-07-2019/</i>	54
Figure 53: Bioscleave Plan <i>Source: Bioscleave House (Lifespan Extending Villa). Retrieved from http://www.reversibledestiny.org/architecture/bioscleave-house-lifespan-extending-villa.</i>	54
Figure 54: Bioscleave Interior 3 <i>Source: a house that claims to stop ageing and death is on the market for \$1,495,000. (2019, December 11). Retrieved from https://www.designboom.com/architecture/bioscleave-house-arakawa-gins-east-hamptons-on-sale-02-07-2019/</i>	54
Figure 55: Bioscleave Interior 4 <i>Source: a house that claims to stop ageing and death is on the market for \$1,495,000. (2019, December 11). Retrieved from https://www.designboom.com/architecture/bioscleave-house-arakawa-gins-east-hamptons-on-sale-02-07-2019/</i>	54
Figure 56: Challenging All Skills, Analysis Drawings of Bioscleave House <i>Source: By Author</i>	54
Figure 57: Series of Photographs and Drawings of KUBE House of Culture and Movement <i>Source: Hernández, D. (2016, September 2). Ku.Be House of Culture in Movement / MVRDV ADEPT. Retrieved from https://www.archdaily.com/794532/ke-house-of-culture-in-movement-mvrdv-plus-adept</i>	55
Figure 58: Active Circulation Study <i>Source: By Author</i>	56

Figure 59: Movement Analysis <i>Source: By Author</i>	56
Figure 60: Maison de Verre Sliding Elements at Stairs <i>Source: Marshall, B. (2016, July 18). Maison de Verre Paris by Pierre Chareau Bernard Bijvoet. Retrieved from https://www.yellowtrace.com.au/maison-de-verre-paris-pierre-chareau-bernard-bijvoet/</i>	57
Figure 61: Maison de Verre Sliding Elements in Bathroom <i>Source: Marshall, B. (2016, July 18). Maison de Verre Paris by Pierre Chareau Bernard Bijvoet. Retrieved from https://www.yellowtrace.com.au/maison-de-verre-paris-pierre-chareau-bernard-bijvoet/</i>	57
Figure 62: Maison de Verre Retracting Stair <i>Source: Marshall, B. (2016, July 18). Maison de Verre Paris by Pierre Chareau Bernard Bijvoet. Retrieved from https://www.yellowtrace.com.au/maison-de-verre-paris-pierre-chareau-bernard-bijvoet/</i>	57
Figure 63: Flexible Plan <i>Source: By Author</i>	58
Figure 64: Flexible Interior in Section <i>Source: By Author</i>	58
Figure 65: Live, Work, Play <i>Source: By Author</i>	58
Figure 66: Block 10 Units <i>Source: 5468796 architecture: bloc 10. (2012, August 8). Retrieved from https://www.designboom.com/architecture/5468796-architecture-bloc-10/</i>	59
Figure 67: Bloc 10 Massing <i>Source: 5468796 architecture: bloc 10. (2012, August 8). Retrieved from https://www.designboom.com/architecture/5468796-architecture-bloc-10/</i>	59
Figure 68: Dwelling Study 2 Unit Forms <i>Source: By Author</i>	59
Figure 69: Star Apartments, Axonometric of Organization <i>Source: 16 September, 2013 B. N. M. L. (n.d.). Street Life: Michael Maltzan's Social Housing in Los Angeles. Retrieved from https://www.architectural-review.com/buildings/street-life-michael-maltzans-social-housing-in-los-angeles/8652420.article?blocktitle=Buildings&contentID=7577</i>	59
Figure 70: Star Apartments, Elevation <i>Source: Frearson, A. (2016, September 2). MVRDV and Adept team up on community centre that invites grownups to play. Retrieved from https://www.dezeen.com/2016/09/02/ku-be-community-centre-mvrdv-adept-frederiksberg-copenhagen-mazes-slides-nets-climbing-walls/?fbclid=IwAR2RW_hRrY-NzkDLmSh3_rwSfGLEvDQ-0a1c_AejeTvdniI8TuR6kguESIQ</i>	60
Figure 71: Star Apartments Aerial View <i>Source: Star Apartments: Michael Maltzan Architecture. Retrieved from https://www.mmaltzan.com/projects/star-apartments/</i>	60

Figure 72: Analysis Drawings <i>Source: By Author</i>	60
Figure 73: Analysis Drawings <i>Source: By Author</i>	60
Figure 74: Movement in Section, Dwelling Study 1 <i>Source: By Author</i>	61
Figure 75: Senses in Section, Dwelling Study 1 <i>Source: By Author</i>	61
Figure 76: Bodily Movements, Zones and Hybrids <i>Source: By Author</i>	62
Figure 77: Courtyard Housing: Opportunity for Social Interaction and Community <i>Source: By Author</i>	63
Figure 78: Social Inclusion in and Outside of the Home <i>Source: By Author</i>	63
Figure 79: Extensions of the Home <i>Source: By Author</i>	64
Figure 80: Building Scale and Connections <i>Source: By Author</i>	64
Figure 81: Mid-rise Connection <i>Source: By Author</i>	64
Figure 82: Axonometric of Housing Proposal <i>Source: By Author</i>	65
Figure 83: Fragment of Housing Proposal <i>Source: By Author</i>	65
Figure 84: Shared Circulation and Communal Core <i>Source: By Author</i>	65
Figure 85: Preliminary Building and Site Massing Model, 1:500 <i>Source: By Author</i>	66
Figure 86: Fragment Massing, 1:100 <i>Source: By Author</i>	66

SECTION 5: DESIGN PROJECT

Figure 87: St Lawrence Neighbourhood <i>Source: Toronto Neighbourhood Guide. (n.d.). Retrieved from https://www.torontoneighbourhoods.net/neighbourhoods/downtown/st-lawrence?overview</i>	71
---	----

- Figure 88:** The two principle design elements of St Lawrence Neighbourhood: traditional, street-facing urban townhouses and mid-rise apartment blocks, both taking shape c.1980. Canadian Architect, June 1981. 71
Source: Who built Toronto's St Lawrence Neighbourhood? (2015, May 11). Retrieved from <http://activehistory.ca/2015/05/who-built-torontos-st-lawrence-neighbourhood/>
- Figure 89:** Crombie Park, the centre and heart of the St. Lawrence neighbourhood 72
Source: CEDRO, CIP/ACUPP Case Study Series. (n.d). Directions for New Urban Neighbourhoods: Learning From St. Lawrence, The City of Toronto. Retrieved From: https://www.ucalgary.ca/EV/designresearch/projects/2001/CEDRO/cedro/cip_acupp_css/pdf/st_lawrence.pdf
- Figure 90:** Edgeview Housing Cooperative - Community Gardens 1 76
Source: Edgeview Housing Cooperative. (n.d.). Retrieved from <https://www.facebook.com/edgeviewcooperative/photos/a.1861389794120170/1955741638018318/?type=3&theater>
- Figure 91:** Edgeview Housing Cooperative - Community Gardens 2 76
Source: Edgeview Housing Cooperative. (n.d.). Retrieved from <https://www.facebook.com/edgeviewcooperative/photos/a.1861389794120170/1955739228018559/?type=3&theater>
- Figure 92:** Edgeview Housing Cooperative - Community Gardens 3 76
Source: Edgeview Housing Cooperative. (n.d.). Retrieved from: <https://www.facebook.com/edgeviewcooperative/photos/a.1861389794120170/1955739234685225/?type=3&theater>

INTRODUCTION

HOUSING AS A DIVERSE DISCOURSE

Housing plays a critical role in our everyday lives, yet it presents complex and multi-faceted design problems. The breadth of the discourse and variables within housing, are quite extensive and involve a variety of intertwined facets such as social, political, and economic issues, societal processes, social relations and transformations, policy and planning, energy use, affordability, accessibility, cultural implications, well-being, and more. It is not possible to address all facets at once, and therefore a specific focus of study is critical to develop meaningful findings on a specific thesis topic. Different housing typologies can prove useful to address specific variables, and therefore a question of typology is important. This thesis focuses on mid-rise urban housing in the Canadian context, and in particular analyzes it from the perspective of human well-being. To do this, it develops proposals which incorporate strategies for active living through physically and socially engaged lifestyles, that enable spatial variety and bodily engagement.

MID-RISE HOUSING

The design of current mid-rise apartment housing in Toronto could be better developed to improve human well-being; such as providing multiple orientations to daylight, access to air and views, and biophilia. Often the reasons why they do not do so, relate to affordability and space available, small, dense, urban sites. This thesis acknowledges the role of apartment housing in Toronto as an economic instrument, but focuses instead on developing and testing how a new approach can use housing as an instrument for well-being and movement, rather than economy. In this thesis, design research is conducted that allows for a unique perspective on this subject and creates new knowledge. Through literature review and analysis of case studies, ideas extracted are to inform design research methods, allowing the design of a mid-rise urban housing proposal to be the main experiment to develop and test these ideas. Design research requires critical reflection and the testing of ideas through investigation, and this thesis document is the summary of the process and reports on key findings.

SHIFTS IN LIVING

More than ever we are spending more time in our homes. As more people work from home, people are aging in place and 'traditional' family roles no longer have one standard structure, it can no longer be assumed we require a standard spatial arrangement. This shift in how we live requires new forms of housing; including better shared spaces and a variety of environments which can create new activities and behaviours and improve our well-being. In many cases, designers continue to primarily design traditional housing forms which reinforce sameness and lack of variation which instigates repeatable and familiar actions -- imposing on our physical well-being and quality of life. Isabella Ong reflects on these issues in her essay "Bad(Habit) at: Architecture As Action Forms", as she describes how the normative architectural notion that a house should be designed to reinforce habits and our conditioned ways of living, has led our bodies and minds to slip into the 'automatic', as they are not being challenged (Ong, 2019). The concern is that this may result in people's decline in well-being such as decreases in motor function, cognitive abilities, and even life span. Ong also asserts that "conventional designs often disregard the suggestive influence inanimate objects have on our behaviour (2019). This is why it is important as designers who have the ability to shape the environments around us, to understand how space can allow the body more freedom rather than being restricted to limitations between what actions and programs can take place in spaces. This thesis asks *what alternative typologies might afford more physically active and socially engaged lifestyles while being more grade connected and in tune with the human scale?*

EVOLVING ARCHITECTURAL PERSPECTIVES

Complementary to Ong's view of bodies and habits, Bernard Tschumi's view of change and disjunction in architecture provides a perspective which acknowledges the dynamic nature between body, space and building. Tschumi states that for "three thousand years of architectural ideology [people] have tried to assert the very opposite" (1996, p.19) -- the ideology that architecture is about stability, solidity and foundation, rather than the "inevitable disjunction of confrontation of space and use" which is "constantly unstable, constantly on the verge of change" (1996, p.19). This paradox between comfort and habits, challenge and new opportunities, highlights the

potential for a more dynamic and active architecture that challenges our physical abilities and conception of lived spaces. This thesis explores these concepts through a design for a mid-rise urban housing development that balances movement and variation with choice for spatial flexibility and level of physical activity.

A NEW APPROACH

Since there are proven links between the qualities of the environments we live in, and the way people behave in space, it is important that architects think about the role they play in influencing how space can be used and what potential behaviours are afforded. This thesis proposes enhancing urban housing for well-being through physically and socially active environments. New spaces, flexibility, and movement can inform a new way of living which creates greater connection to our neighbours, each other, and communities. The theory of affordances, as coined by James Jerome Gibson and detailed in *Section 4: Research Themes*, can be applied to the design of spaces with action possibilities, and carefully considered proximities, adjacencies, and public and private gradients.

Figure 1: The End of Sitting: possibilities of radical change for the working environment, RAAAF Architects

DESIGNING FOR ACTIVE LIFESTYLES

Figure 1 displays a project by RAAAF Architects in the Netherlands which aims to reduce limitations of the body and activities that take place in a working environment. They do this by creating a new dynamic landscape. In residential architecture, the variety of use and experience is questioned,

as French novelist Georges Perec questions the habitual stating that our “conditioned way of living [have] desensitised us” stating that “this is no longer even conditioning, its anesthesia” (1997, p.210). An underlying assumption of his thesis is that architects should challenge our conditioned ways of living and create variation of space and use so that our minds and bodies are strong and healthy.

On this question of variety, different scales of housing need to be addressed since private dwelling, and shared living spaces require different design parameters. Gradients between housing and city are needed so that interstitial spaces between the public city and private home can exist; providing a range of opportunities for active lifestyles, privacy and comfort. These gradients can be designed to allow for new housing forms to emerge that can better suit how people live. This thesis explores architectural questions such as *can new forms create new behaviours, and if so, what is this new way of living?* It also questions how shared living spaces can be an agent for active living and *what variables are necessary for physical and social interactions?*

INITIATE ACTION: THE SPATIAL AND NON-SPATIAL

This thesis examines case studies and architectural theories of housing to understand which qualities, design parameters, and spatial manifestations of architecture have the ability to engage people and become more active. The qualities of urban mid-rise housing such as lighting conditions, access to views, biophilia, and air are examined to see how they can be re-calibrated to encourage people to lead more active lives and feel more fulfilled with the quality of their living environment. Active architecture can nudge people to “alternative actions” (Ong, 2019) through its spatial qualities as well as its material qualities. For example, **Figure 2** shows Bruno Munari’s photographic sequence of seeking comfort in an uncomfortable chair, where the material qualities of the chair have a ‘grip’ over his body, affording him different ways to be positioned. It is important to think about the non-human and the role it has on shaping behaviour and the design of lived spaces. And in addition to the role of the material environment in creating opportunities for different actions, spatial and sensory influences must be considered as well.

Figure 2: Bruno Munari's Seeking Comfort in an Uncomfortable Chair (1944): the 'material thoughts', of the chair, subverting the armchair's canonical grip over the body

THESIS OBJECTIVES

The main question that thesis explores is: *how can alternative amenities, qualities, organizations and designs for apartment housing afford more physically active and socially engaged lifestyles in an urban context?* This thesis investigates a new conception of active dwelling focusing on:

- Flexible and varied living environments which engage the body to move in more ways than typical apartment housing
- Social interaction opportunities adjacent to the private dwelling, and as an extension of the dwelling
- Emphasis on stair use that is tied to social spaces – incorporating daily active behavior
- Alternative routes of circulation providing variety and choice for experience and use of space – nudging people to walk more and be active, but not forcing to do so by providing a variety of options for circulation and activity
- Human scale relation with front doors at grade and connection to street life
- Views to nature
- Multiple orientations to daylight
- Close proximities between shared and private living spaces

A CASE FOR MOVEMENT & VARIATION

01

BACKGROUND AND CONTEXT

48% of Canadians 12 and over (~12.7 million) are inactive - *Statistics Canada*

ACTIVITY AND WELL-BEING

We spend 90% of our time indoors (Canadian Parks Council, 2014), revealing how important architecture and lived spaces are for our daily experiences. Due to increases of being indoors, physical activity and exercise are continually becoming global concerns in relation to the health of the global population. As stated in a CBC News Article Titled: “Half of Canadians Physically Inactive, StatsCan Says”, “forty-eight per cent of Canadians aged 12 and over — or about 12.7 million people — are inactive, getting the equivalent of less than a half-hour of walking each day, and 25 per cent say they sit most of the day” (2007, August). There are many reasons why we are becoming increasingly inactive such as becoming more digital, working from home, types of leisure activities and emergence of conveniences such

Figure 3

Figure 4

Figure 5

our lifestyles are eliminating the need to move

inactivity leads to declines in cognitive function, motor skills, and even lifespan

as Uber eats which are eliminating the need to move and perform regular daily activities. These low levels of activity have proven to have significant effects on decline in cognitive function (**Figure 6**), in addition to motor skills (**Figure 7&8**), and even lifespan – posing a threat to our well-being and quality of life as we age.

Studies have shown the severity of the issue and linked to this, “approximately 747,000 Canadians are living with cognitive impairment including dementia” (Alzheimer Society, Canada, 2012 in Chang, Patel & Schulz, 2015), which is one of the main causes of disability later in life, “ahead of cancer, cardiovascular disease and stroke” (Alzheimer Society, Canada, 2015). In an NCBI journal: “Lessons Learned from Alzheimer Disease: Clinical Trials with Negative Outcomes” by Jeffrey Cummings, drug trials have “proven to be unusually difficult with a 99.6% failure rate” (2017), and turning to exercise and physical activity has strong evidence in lowering risk of cognitive decline and in overall well-being. It is possible to improve our minds and bodies in ways which do not rely on drugs, hence the focus on the role that physical movement, activity and exercise has on our daily lives.

“Our Brain is Like a Muscle”

Physical activity actually changes the brains physiology, anatomy and function according to neuroscientist Wendy Suzuki. In her 2018 TED Talk, Suzuki explains that the more you work your brain out, the bigger and stronger the hippocampus and prefrontal cortex gets eliminating risk or taking longer for neurogenerative diseases and cognitive decline to have an effect. As she describes, the simple solution is physically moving our bodies since it reduces risk levels substantially of cognitive impairment later in life, and acts as a preventative strategy (Suzuki, 2018). Simply moving the body is the most transformative thing you can do for your brain, as it creates immediate long-lasting effects and protective benefits. However, immediate effects of being active are transient – the body needs variation and challenge for long lasting effects (Suzuki, 2018). As stated by Christopher Bergland in an article titled “Physical Activity Improves Cognitive Function”, “physical

Figure 9: Movements, By Author

*“simply moving your body creates
immediate long-lasting effects and
protective benefits for your brain”
(Suzuki, 2018)*

activity done today can benefit cognitive function for decades down the road”, and “studies have shown that regular physical activity and fine-tuned motor skills benefit cognitive function beginning in infancy and continuing through every stage of our lives” (2014).

Benefits of Exercise and Movement

Research states that it is never too late to start, and “becoming more physically active after midlife was shown to lower dementia risk” (Bergland, 2014). But not only is physical activity important for the well-being of our brains:

regular exercise changes the brain to improve memory [and] thinking skills, and exercise helps memory and thinking through both direct and indirect means. The benefits of exercise come directly from its ability to reduce insulin resistance, reduce inflammation, and stimulate the release of growth factors – chemicals in the brain that affect the health of brain cells, the growth of new blood vessels in the brain, and even the abundance and survival of new brain cells (Godman, 2018).

In addition, Godman explains how “indirectly, exercise improves mood and sleep, and reduces stress and anxiety – problems in these areas cause or contribute to cognitive impairment” (2018). Our bodies need variation and challenge and the ability to become more active in our daily lives. By taking care of our bodies through active living, we approach a new active lifestyle that revolves around self care, enabling us to become better and live stronger and smarter into old age. The built world has the ability to stimulate and challenge our bodies and minds. Unfortunately, particularly in housing, there are too often competing priorities in design, and the result is that apartment designs do not encourage movement. We are lacking this sense of variety and challenge -- revealing an untapped potential for an active architecture.

ISSUES WITH CURRENT HOUSING

Acknowledging these facts, it becomes apparent of the flaws in many of Toronto’s apartment housing since they have increasingly become repetitive, bland and prescriptive in their function, use, and spatial qualities of the

Figure 10: Apartment Housing Units ,By Author

**Junction House, Mid-Rise, I
bedroom Unit 626ft²**

*one level, volumetrically
constrained*

*one orientation of
daylight*

*Prescribed, fixed divisions of
space*

*reinscribe the
movement of bodies in
space*

bathroom
 kitchen/dining
 living
 bedroom

Figure 12: Reinscribe Movement of Bodies into Space Through Hybridization of Program in Plan and Section: Inspired by Tschumi's "New Conception of Architecture", By Author

dwelling (**Figure 10**). There are three main areas of critique which must be acknowledged to create an active architecture for urban housing.

Current Housing:

- *lacks variation*
- *reinforces habits*
- *views body and space independent from one another*

As seen in the diagrams in **Figure 11**, our apartments are spatially homogeneous, typically consisting of a one level plan, that is volumetrically consistent among the entire dwelling. Programs and design conventions are mostly assigned and fixed, and limit alternative uses or experiences within the dwelling – further limiting the use of the body. Some variables which contribute to this lack of variation are lack of relation to human scale, lack of views to nature and daylight due to spatial relationships and proximities. This lack of variation can be overcome with what Bernard Tschumi describes as a new dynamic conception of architecture, where we reinscribe the movement of bodies in space (**Figure 12**). With this new perspective, space

and body are dynamic, and there is opportunity to incorporate experiential, or behavioral variation.

The simplistic and repetitive designs of our urban housing have made things efficient and easier -- providing a sense of convenience. However, current designs have trained our bodies to manoeuvre around standard dimensions (Ong, 2019), and as our bodies adapt, it stops sending sensory signals to the brain (Friedrich in Pazzanese, 2016). It is then that architecture limits our actions and our bodies slip into indolence (Ong, 2019). This leads to what architect George Teyssot reveals the normative architectural notion that a house should reinforce habits, stating that “habitations are actually places for long habits” (p.53). Architecture should disrupt the habitual, since our habits act as a filter restricting alternative actions and reducing potential for variety of interactions (Ong, 2019).

Figure 13: Smoothing and Pliancy Concept Diagrams, By Author

Figure 14: Environment as Extension of the Body, By Author

Disrupting the Habitual

Disrupting the habitual and our conditioned ways of living can be done through what architect Greg Lynn describes as smoothing, pliancy, and folding (**Figure 13**). If we focus on space through fluid tactics of mixing and blending, we can begin what he calls smoothing, and new spatial possibilities emerge. Pliancy, however, allows flexibility, which first implies an internal flexibility, and second is dependent on external forces for self definition (Lynn, 1993) – for example, by the action of a body. Folding, allows for unrelated elements to produce unexpected outcomes, and his concepts lend well to breaking down our conditioned ways of living and allowing the body to physically act as a force in defining space and creating variation.

Environments Afford Action

We are not as free willed as we like to think. According to philosopher Henri Bergson, “the enviroining matter participates in the production of our thoughts and actions, suggesting to us how to act upon them. It is when we treat our environments with little potential for affordances, or action possibilities, that our environments become limiting (1988), and active lifestyles become harder to achieve. Our current housing typically disregards the potential which the material environment has on our actions, and to act as extensions of our bodies (**Figure 14**). Environments are “the condition for human action” (Grosz, 2001, p.177), and adopting a theory of affordances acknowledges nonhuman entities as co-constitutive of human agency (Ong, 2019). With this adoption of affordances, it ensures that the environment is always relevant to the human, and vice versa (Ong, 2019).

Figure 15: Active Design Nudge through Signage

POOR ACTIVE DESIGN GUIDELINES

Towards and Active Architecture -- Revisiting Active Design Measures:

To incorporate self-care, active lifestyles, and well-being into our architecture, we must understand how active design plays a role in providing agency to better our minds and bodies. Our current approaches to active design fail to incorporate the the variety of ways which our bodies can move, and their benefits. As stated in *Active Design Supplement: Affordable Designs for Affordable Housing* (2013), active design advocates for three key measures to be taken to incorporate physical activity into daily life:

1. Increase stair use among the able-bodied by providing a conveniently located stair for everyday use
2. Locate building functions to encourage brief bouts of walking to shared spaces such as mail and lunchrooms
3. Provide facilities that support exercise such as centrally visible physical activity spaces

(above 3 points are explored in detail in section 4: *Research Themes*)

The issues lie among focusing solely on stair use and the movement of walking, and brief bouts of exercise to centrally located programs. Instead, this thesis aims to explore a new conception of active design which will engage the body through different movements beyond walking and create more continuity of bodily activity throughout the entire building, where activity is not centrally located -- it is everywhere.

Figure 16: Movement Section on WELL Standard's Website

The WELL Standard is becoming a highly regarded “performance-based system for measuring, certifying, and monitoring features of the built environment that impact human health and wellbeing” (Knox, 2015). Their

concepts for promoting movement, physical activity and active living that “discourages sedentary behaviours” (WELL, 2019) still focus on checklists that typically don’t help designers understand the spatial aspects to the requirements. There needs to be a balance between spatial, sensory and object/material design tactics which promote action and movement in our architecture if we are to achieve high-quality and effective design for active living. This thesis expands on this knowledge and explores new ways of living and designing mid-rise apartment housing.

Approaching Active Design Differently

Combining Tschumi’s notion to reinscribe the movement of bodies into space to create a new dynamic conception of architecture (1996) with active design, calls for new way of approaching how we can actively live and what it means to design for it. A new conception of active design strives to engage our bodies through the spatial, sensory and material aspects of our living environments, and allows for cues or moments that create activity and movement. Active Design guidelines today are not sufficient for informing spatial qualities or relationships, as they rely on many non-spatial parameters such as increased signage, making stairwells visible, painting key areas so that people are aware, etc. As described by Jonathan Maier, Georges Fadel and Dina Battisto in their paper titled *An Affordance-based approach to architectural theory, design, and practice*, (2009) they state that “modern buildings also sport an abundance of signage to explain to people how the buildings should be used”, and reference Donald A. Norman’s *The Psychology of Everyday Things* where he points out about objects in general, that “if they require written instructions, they are probably bad designs” (Norman. 1988, in Maier, Fadel, & Battisto, 2009).

Allowing architecture the agency to provide active environments through affordances and affordance-theory, informs design research methods and generates new knowledge.

INTRODUCTION TO AFFORDANCES

Affordances, are essentially action possibilities which Aaron Betsky mentions is “a new buzzword around architecture schools these days” and the term

was coined by psychologist J.J. Gibson in 1977” (2015) in his article “The Theory of Affordances”. Affordances in the context of architecture, allow for designers to understand how the environment can serve people, and how design can provide, or, ‘afford’, different actions, behaviours or even feelings. In the physical environment, we have “molded and shaped surfaces to afford us a variety of different possibilities from being able to navigate them to providing us perches, places to gather, and any number of social and solitary activities” (Betsky, 2015). The theory of affordances and their properties and applications will be discussed further in Section 4: *Research Themes*, however a brief background and introduction to affordances is necessary to understand the powerful role it can play in creating a new conception of active architecture and the dynamic nature between our bodies and spaces.

RAAAF Architects

As argued in the introduction, RAAAF Architects explores this theme of affordance theory in design. **Figure 17** is another example of affordance-based design again by RAAAF Architects. This installation titled *Breaking Habits*, puts affordances into the context of dwelling, as it imagines living environments without chairs and couches, while exploring tilted surfaces for a way of diagonal living made by a system of flexible carpets (Walsh, 2017). Since sitting for long periods has been proven to be unhealthy RAAAF aims to address this concept through a new way of living and by using carpets that afford adaptation and support to the body. RAAAF states:

“This physical thinking model materializes a philosophical world view and makes it tangible: a diagonal landscape of affordances scaffolds a most active lifestyle by inviting to change positions...will diagonal living become the new norm? – RAAAF”

Challenge

Through an understanding of affordances, researchers and designers have “opened new vistas and made natural surfaces more useful, while also creating environments that are more dangerous and challenging” (Betsky, 2015). This aspect of challenge plays an important role in stimulating our cognitive and physical well-being, since as we adapt to repeated and unstimulating environments, our bodies slip into a state of ‘automatic’ and less sensory signals are sent to the brain (Friedrich in Pazzanese, 2016). Dull

Figure 17: Breaking Habits,
RAAAF Architects, Netherlands

environments with lack of variety, stimulation and challenge prove to negatively impact our motor functions, cognitive function, and overall physical/mental/ social well-being. Since affordances describe how an object, element, or environment can be used or experienced in a variety of different ways, or has a variety of different possibilities for how it is used or perceived, the action possibilities they bring shape our senses and allow uses to understand their environment and how they can develop in and through it (Betsky, 2015). In Betsky's terms, affordances are [...] a way of seeing architecture as an evolving interactive landscape" which is an architecture which bases itself on how it can be perceived and how its uses can be exploited in various ways (2015). The static nature of housing design which focuses less on how people move in space, has a lot to learn from affordance-based architecture theories which allow designers to "understand buildings not as objects, but as environments that afford us possibilities" (Betsky, 2015).

Importance of Well-Being in Design

We are living in a world that is increasingly facing health risks such as cognitive decline, poor physical health, and declines in social inclusion, leading to mental illnesses such as depression. Rather than creating additional pressures on health care systems and resorting to drugs, if it were possible to live a healthier lifestyle and live healthier and smarter into old age simply through the design of our living environments, would people object? Part of making active living enjoyable is through affordances that optimize how space is used while incorporating elements of fun, play, and sense of community and overall well-being. Through affordances, a new realm of active design can emerge which can truly improve people's well-being, get people moving, and live smarter and healthier into old age.

THINKING DIFFERENTLY ABOUT HOUSING

Affordance theories can help to create a new way of approaching active design that truly creates more activity and interaction. Although affordances are a key influence on this thesis, ways which other architects and designers have pushed the boundaries of architectural thinking can also prove useful. For example, Rem Koolhaas and Bernard Tschumi both paid particular attention to ramps, spaces of movement and sculpted voids in their design

projects of the 1990s (Dunham-Jones, 2013), which help to address spatial aspects of movement and interaction. Ellen Dunham-Jones explains in her article titled “The Irrational Exuberance of Rem Koolhaas” that both Tschumi and Koolhaas “de-emphasize formal boundaries; and perhaps most innovative of all, both promote programmatic instability in order to counteract architectural rigidity” (2013). The division of spaces in housing can lead to attributes which do not lend well to creating activity, connections and movement. If a clear benefit could be seen with a new typology of housing which creates exciting and enjoyable active design, perhaps architecture could sway contemporary society to become more playful and explorative with this new type of architecture which can improve our lives now, and as we age.

Bodies as a Tool For Variety

This thesis suggests thinking differently about how we approach housing and how our well-being can be improved by incorporating more movement and active opportunities. These opportunities allow for the body to engage with space, and for us to live more active lifestyles. Our bodies then can become active agents in participating in, and manipulating space, while allowing architecture the agency to nudge our movements or behaviours in a variety of ways. Active design principles for this thesis focus on the role which affordances can play through space, sense, and the material environment.

Research Themes

This thesis examines literature and case studies to form design research methods which uncover how affordance theory can create new forms of housing and relationships that allow people to live more active lives. Research themes cover 3 key topics which are 1) affordance theory and application, 2) architecture of movement, change and variety, and 3) active living for well-being. The key findings from this research help to develop design ideas about:

- variety of movement and experience in urban housing
- how new forms of housing can create new behaviours for well-being, and
- the role which gradients of public and private between housing forms and the city can create interstitial active and social zones

CURRENT CONTEXT

02

HOUSING IN TORONTO // where are we now?

HOUSING CRISIS

Toronto has adopted an approach to urban housing which results in fairly static, unambitious designs, which lack variety in their spatial and material qualities. Although the model of the urban apartment has been driven by economic gain, it has become the most common typology in the city for housing. Floor plans are stacked and repeated, with little space for activities outside of the private residence. Yet, since the private residence is typically very small, it cannot accommodate a variety of uses since it is prescriptive in its program and use -- this is due to a range of constraints. Pressures of high land prices and decreases in developable land, make affordability a large driver for these small and unambitious apartments. Small living doesn't have to mean poor quality, rather it invites new thinking about multi-functionality and efficiency which can bring variety. In Toronto's typical apartment layouts, elevators are placed in the centre of the floor plate with stairs pushed to the exterior, with no other options of circulation -- further encouraging people to become less active.

Designing for Well-Being

Housing has a great potential to impact and improve our daily lives, and in the case of the conventional Toronto apartment, this opportunity is lost due to repetitive dwellings and forms which generate as many units on a small footprint as possible -- lacking spatial or programmatic variety. **Figure 18 and Figure 19** show the interior and exterior qualities of unambitious housing which do not vary in form and spatial opportunity. **Figure 19** depicts photographs of a 380ft² bachelor apartment in Toronto showing the entire living space, and the tiny kitchen. The unit only has one orientation to light and views, and is very limiting with what can be done within the space, since there is little flexibility for alternative uses. Where **Figure 18** in contrast, shows a headline titled "All those unused condo balconies? Most of us won't buy without them". The article describes the Fort York apartments which there is barely "a soul in sight on those tiny, ubiquitous terraces" (Kalinowski, 2018), gesturing to the notion that these spaces have become lifeless and almost irrelevant. So how do we get people to use spaces? This is where the design both spatially and materially can create architecture which promotes

Figure 18: Poor Architectural Quality: Unambitious Exterior: Unused Balconies

Figure 19: Poor Architectural Quality: Bachelor Apartment Living Space & Kitchen

Poor quality due to one orientation to light and view, little spatial flexibility, and shrunken lived functions making it hard to perform daily tasks such as cooking.

BIG TRENDS IN TORONTO CONDOS WITH SMALL SPACES

Figure 20: Small Spaces Trend

Figure 21: Change in Toronto Population Density: 1970 vs 2016

activity and is lively. Attention to orientation, daylight and views become important in creating spaces which people are attracted to.

Room for Improvement

Figure 20 headlined: Big Trends in Toronto Condos With Small Spaces, shows the trend of small apartments and the use of built-in furniture. This is a good step in addressing small urban living, and is an improvement from **Figure 19**, however it could create more variety through flexibility. Built-in furniture is great, but what about walls and elements that are movable and require physical action? The apartment shown in **Figure 20** provides little variation or autonomy within the space, and what the user can do within it since the elements within the lived space are fixed. The interior neglects the need for daylight in working and sleeping spaces, and to avoid small urban living becoming highly prescriptive and static, parameters such as daylight, air, ventilation, views and connection to biophilia need to be addressed to help inform the spatial qualities and design parameters of small urban dwellings.

Relevance

The current approach to urban housing has potential to improve the well-being of its occupants and encourage active lifestyles. Currently, Toronto is considered “the most populous city in Canada and the largest metro area, with a population density of 4149.5 people per square kilometer”, and in 2013, “Toronto’s population overtook Chicago’s taking its place as the 4th largest city in North America” (World Population Review, 2019). Not only is Toronto’s population increasing, but its growing population and economy “is leading to more people choosing to stay in the city rather than leave to surrounding areas” (World Population Review, 2019). As the city becoming more densely populated, architectural innovations which improve quality of life for residents, and relieve pressures of declines in well-being should be explored.

CRITIQUING TORONTO APARTMENTS: THE UNIT SCALE

The Plan

Too many apartment buildings or high-rise residential towers lack qualities

Figure 22: 1 Bedroom, Aura, Toronto, 532 ft²

Figure 23: 2 Bedroom, Great Gulf, Monde Condos, Toronto, 938 ft²

Figure 24: 3 Bedroom, Alter Condos, Toronto, 1285 ft²

Figure 25: Functions of a typical condo/apartment: 1 bedroom, Aura, Toronto

that are essential to foster engaging environments that help aid well-being and encourage activity while connecting with the city. Although all three of the plans show on page 26 can allow daily activities to occur such as cooking, cleaning, sleeping and eating, the tight space allows no extra opportunity for customization or alternative daily activities. This is because spaces are assigned to a fixed use or program and lack flexibility. This is where to a degree flexible architecture interiors that create hybrids of spaces and programs can help accommodate more variety within the dwelling, while communal living allows for extensions of functions of the home. Although **Figure 24** is much larger than **Figure 22**, it is a rarity. **Figure 24** is a 3 bedroom apartment which is hard to come by in Toronto. It is increasingly difficult to have a family whether the apartment is rented or owned, and even if one can afford an apartment, it does not offer any extra opportunity to allow people to customize the space to their cultural, social, family, and daily practices.

Typically, since most apartments offer only bachelor, 1 bedroom, and 2 bedroom units, they are not designed to have spaces which suburban homes have, and accommodate family needs. The 'conventional' Toronto

apartment plan has common characteristics such as:

- *typically only one orientation to daylight (Fig.22,23)*
- *borrowed light (ie bedrooms, Fig. 22)*
- *no 'play' space for children*
- *no 'yards', or exterior social/personal space*
- *no quality of residential streets: leafy-ness: just a bland hallway*
- *minimal intimate neighborly connections*
- *limited social integration/connectivity*

Although family sizes on average are shrinking, this does not mean smaller families or non-nuclear families do not require space to go about their daily routines. Our relationship with home is changing, as our family sizes are changing (less kids, more multi-generational households), our relationships

Figure 26: Gehl's Observations on Distance, Perception, and Thresholds

with work are changing such as more people are working from home, and the aging population is growing and desiring to age at home. The 'cookie-cutter' apartment is not a viable housing option that can improve quality of life and well-being. Basic functions of how we behave and live can't happen in these poorly designed apartments, and this is why the design of the private dwelling and communal shared spaces are critical in bringing back variety, activity and well-being into urban residential architecture.

Part of improving urban housing is to understand thresholds and planning principles of how people interact, and engage. Gehl is an advocate for human-scale design, since it relates to our senses, experiences and behaviour better (2010). Gehl's observations on distance and perception relate the distances at which we observe the world around us. As seen in **Figure 26**, there are thresholds at which connections through sight are compromised, or are ideal. **Figure 26** shows the images of the distances at the thresholds A, B, C and D. The importance of these thresholds are for making purposeful or meaningful connections between people, and senses of security, while informing questions of scale and proximities for housing forms.

CONDITIONED PRACTICES & PROJECT SITE

The design of our multi-family residential buildings are becoming obedient to the conditioned practices of the economic market. Although this thesis recognizes concerns of affordability as a housing issue, it will not address alternatives to the current economic market, rather it will suggest new ways of designing small apartments that afford more variety. During an initial site investigation for the thesis project, the site of Lower Sherbourne Street and Front Street East was analyzed. Using 33 Sherbourne as an example of the many 'obedient' towers which follow our conditioned practices of apartment housing -- this development follows the existing social, political and economic structures in place. It is grounded by an economic base (the podium) which is set out to the maximum footprint on the site. Followed by an extruded form that reflects the illusion of 'stability' and sameness, and social 'equality' which is expressed through its monotonous, repetitive form.

The tower, shown in **Figure 27** attempts to break this monolithic extrusion

by inserting an intermediate public 'amenity' function, which is an attempt to display that activity does exist within the building. The floor-to-ceiling exterior glazing will call for blinds to be drawn: a symbol of how we provide the perception of connection to our city, but in its failure to do so, it becomes a mechanism for shutting the outside world out. What has our architecture of housing come to? It has become an economic instrument, but in doing so have we lost our ability to connect with one another, and socially/physically express ourselves?

Figure 27: Proposed Tower

Figure 28.1: Proposed Tower Site in Relation to Design Project Site

The site for this thesis has since been reconsidered after further analysis. A new site has been chosen since it is one of the few sites in the city at the scale of an entire block which provides design agency to build a Missing Middle scale building with grade relationships and courtyards -- affording a greater range of options for social interaction and exchange. The red on the map in **Figure 28.2** indicates 33 Sherbourne, with the condo proposal, and the white area is the site of the thesis project at 183 Front Street East.

Figure 28.2, Enlarged View of Project Site: 183 Front Street East, Toronto

HISTORICAL CONTEXT // how did we get here?

The previous chapter, *Chapter 2: The Current Context*, described the current state of apartment housing in Toronto. This chapter examines how we got here, and how it can inform thinking or ways of designing new forms of housing.

APARTMENT HOUSING

Apartment housing since its creation has faced criticism and has not always been considered an ideal form of housing. North America in the 1900s considered apartment housing as a “deviation from the [...] ideal of single-family, owner-occupied homes” (Dennis, 2013). Today, it appears we have difficulty deviating from the apartment typology as the dominant form of housing in cities. Since their emergence, apartment housing has had its challenges, such as in the 1900s people argued they should be “condemned as insanitary, anti-family, and a threat to established property values, undermining ‘cities of homes’ both morally and economically” (Dennis, 2013). Although some of these concerns have been drastically improved, they still have issues surrounding poor support of family life, and overall well-being. The history of apartment housing has made it evident there have always been social stereotypes and people were suspicious about groups

Figure 29: Allan Gardens Bachelor Apartments [from “Midmaples Group” and “Allan Gardens”, promotional booklet (1914) in Dinnick Papers, MU 904, Archives of Ontario]

Figure 30: Kingsley Mansions, erected 1912, north-east corner of King Street West and Jameson Avenue, Toronto [R. Dennis, 1988]

of people living in a single building. This is why new typologies emerge to address the variety of problems. This thesis looks at a new priorities for apartment dwelling in Toronto, which further addresses concerns of well-being, family life, and quality living conditions. Although praised for their efficiency (Dennis, 2013), the rise of apartment housing became primarily a function of efficiency, and this paradigm has left many of the good qualities to be disregarded.

TORONTO'S CONDO CULTURE

Hans Ibelings explains Toronto's apartment housing culture through the critique of repetitive high-rise towers stating that "one doesn't have to be an architectural connoisseur to see that Toronto's [apartment] boom hasn't produced much, if any, outstanding architecture" (2016, p.9). The culture of housing as an instrument of economy has further led our architecture to be pressured into creating "almost identical, almost sub-standard [apartment] floor plans" where "dwellers settle for less both in size and quality" (Ibelings, 2016, p.19). Although affordability is a problem tied to housing, good quality housing designs can still be present in small apartments and do not have to lack good spatial qualities to be affordable. The design of apartment housing makes it seem like it provides certain aspects of the suburban lifestyle (Ibelings, 2016), by offering "relatively hassle-free, detached way of life,

Figure 31: Toronto's Dominant form of Apartment Housing

much like the new homes in the suburbs, [...with] the rise of the big-box stores in down-town Toronto which often occupy the base of [apartment] buildings are ideal for buying groceries once a week, and the arrival of traditionally suburban restaurant chains are further evidence that the [apartment] tower has become a vehicle for the suburbanization of the city core” (Ibelings, 2016, p.29). So then, it can be questioned, what is the *urban* ideal? It appears aspects of suburban lifestyles are desired, yet often forgotten or ignored in urban housing. Therefore, how can a new understanding and practice of the ‘urban ideal’ for apartment housing emerge? Through this new conception of active living, human scale design found in suburban neighbourhoods are incorporated in a highly urban manner, focusing on connectivity with the urban fabric.

Missing Parameters

Even though cities have evolved to provide a range of necessities which they once did not have, the influence of this development on our urban built form should be questioned. Many apartment housing developments are still missing ‘yards’ and substitute them on rooftops as “sky yards” (Ibelings, 2016, p.29), and this should raise questions of impact of scale and human relationships as they can improve well-being. Instead, relocating outdoor amenity spaces from rooftops to lower or intermediate levels, and improving connections to parks within walking distance should more of a focus. The need for mass housing in a dense footprint has often resulted in a lack of attention to the quality and well-being in the spaces which we dwell. This thesis does not propose that high-rise towers should no longer exist as a housing typology, however there is a need for more ‘middle’ scale housing referred to as the “Missing Middle” which has the potential to inform new housing typologies of mid-rise housing.

THE MISSING MIDDLE CRISIS

The Missing Middle is a popular topic in architecture and planning that discusses the issue that there is a missing variety of housing typologies ranging between a single-detached dwelling, and high-rise apartments. Architects like Jan Gehl and Ross Chapin study and argue for architecture that is more intimate with the human scale, and that is engaging with people

Figure 32: Missing Middle, Image via City of Edmonton/Green Space Alliance

forming communities, and connecting with their context. There is a critical gap in quality of housing that provides strong senses of livability such as access to daylight, views, leafy streets, community networks, and public space/amenities. This ‘middle’, as discussed in *House divided: how the missing middle will solve Torontos affordability crisis* by Alex Bozikovic, Cheryl Case, and John Lorinc, (2019) may not be a literal middle between ‘form’ of single-family homes and high-rise multi-family residential towers, rather it is a complex network of options for livable housing conditions that provide variation, experience, good quality space, and active and social lifestyles. Through form and spatial relationships, a new approach to mid-rise courtyard housing can encourage active lifestyles, for example, by being more grade related and integrating housing with street and city life more prominently. In addition, mid-rise courtyard housing can improve access to nature and views since the scale of the building affords accessibility and connection.

Designing Through Scales

Architectural implications for designing Missing Middle typologies can act at different scales. Firstly, designing for different scales requires different actions and parameters, such that low-density, for example infill, versus higher-density such as 8 storey buildings have their own variables and limitations

Figure 33: Scale: People, Trees, and Building Height, By Author

for how active lifestyles can be achieved through design. **Figures 33, 34** and **35** are findings from early design research highlighting relationships of scale between low and high-rise housing to inform missing middle typologies. Design research findings from the studies in **Figures 33, 34** and **35** prove that Gehl's thresholds (2010), do play a critical role in relating to the human scale. Working to connect design with the human scale creates greater opportunities for activity and incorporation of well-being measures. Design research also found that scale of trees and entrances such as front doors play a role in connecting people with housing.

Architectural scales that can be explored for the Missing Middle are that of the building, the site, the interior dimensions, the yard, the street, and trees. Designing at a human scale provides great benefits, and to address density we do not need to solely build high-rises, we can design lower and more compact apartments. The way housing integrates with its surrounding

Some high-rises have mature trees and more of a leafy presence than newer high-rises. Somewhere through time we let go of the importance of including trees and vegetation in our streetscapes and residential areas.

Seen in the third and fourth images, these are both condos built around the 60s with mature trees and a large setback from the street for the entrance of the apartment building creating a transitional threshold. Now, as seen in the fifth image at the bottom, there is zero setback and very minimal leafy presence for the residential tower.

Figure 34: Scale: Heights of Front Doors at Low-Rise Residential Areas Versus High-Rise Highly-Urban Areas, By Author

context such as the street, the neighbourhood, the block and the city, can inform how housing can extend functions of the home beyond the building envelope. Through analysis of livability in terms of daylight, vegetation, and other spatial and physical qualities, ways in which architects design the Missing Middle can be improved.

LOW-RISE RESIDENTIAL NEIGHBOURHOOD:
Sackville Street, and Millington Street
2 storeys

As buildings become larger, in height, their connection to the scale of the human becomes more distanced. Also, in mixed-use areas, there is not a focus on a leafy presence on streetscapes and sidewalks compared to that of the low-rise residential neighbourhood seen in

MID-HIGH RISE MIXED-USE NEIGHBOURHOOD:
Jarvis Street and Dundas Street East
7-10 storeys

the images that show the character of the Sackville and Millington Street's neighbourhood. When not treated as solely a residential area, the importance of the relate-able scale of the human and presence of flora are very limiting. The scale of people, buildings, trees, and

HIGH RISE, MIXED-USE NEIGH
Yonge Street and Gerrard Street
79 storeys

sidewalks are connected to create welcoming environments that make them more enjoyable. All 4 should be considered in unison when designing residential and mixed-use areas. The public realm is important in all areas of a city.

Figure 35: Scale: Heights of Trees at Low-Rise Residential Areas Versus High-Rise Highly-Urban Areas, By Author

RESEARCH THEMES

04

RESEARCH THEMES

This section summarizes key literature and theories which inform the thesis topic and design project. The section summarizes the research into 3 main themes which add knowledge to the thesis topic:

1. Affordance theory and application
2. Architecture of movement, change and variety
3. Active living for well-being

AFFORDANCE THEORY AND APPLICATION

Theory

The term affordances, coined by American psychologist James Jerome Gibson, questions visual perception and how our environments play a critical role in our actions and behaviour. Gibson's theory of affordance expands understanding on how the environment and "different objects of the environment have different affordances for manipulation" (Gibson, 1986, p.128). Gibson is implying with the definition of affordances that both the animal and its environment complement one another, and can be found through objects, surfaces and conditions of the environment, and their relativity to the scale of the observer/user (Gibson 128). Gibson's theory allows for a connection between body, space, and object, creating a variety of action possibilities which manifest through the qualities of the environment. For example, if flexibility is observed in a chair, the pliable surface of that chair can afford different positions, which the body can alter to suit its unique dimensions or to whichever position it desires. **Figure 36** and **Figure 37** show different ways of body interacting with its environment which affords it different spatial or bodily opportunities.

Figure 36: Flexible chair affords opportunity for variety of sitting positions and the act of laying, By Author

Figure 37: Perceived affordance of pushing and pulling: relationship of body to place or object, by Author

Architecture has become quite prescriptive, particularly in residential design, and has become limiting to the use and actions of the body – creating limitations, and less freedoms. Gibson mentions how composition and layout of surfaces constitute what they afford (1986, p.127) however, spatial compositions and layouts are not discussed in Gibson’s theory. Not only can objects possess affordances, affordances can manifest spatially, affording atmospheric qualities, new design relationships, new uses, behaviours or experiences. These variables should be considered for a new conception of active living in the urban context, and inform design research exploration.

Isabella Ong describes affordance-based architecture as “the encounter of body meets space” (2019), and **Figure 38** depicts MUNARI routes in midair by Francesco Librizzi studio (2013), as an example of affordances at the intersection of body meeting space. Ong describes MUNARI routes as a depiction of affordances by pointing out the “metal structures [which] suspend in the air in which visitors can hang, sit, or swing. The geometry of the structures is kept simple and thus open”, as “we [...] explore and acquaint ourselves with the mechanisms of our bodies” (Ong, 2019). The display can also inform the importance of choice, and that balance between opportunity and action should be offered. Affordances allow for options to deviate from a singular way of interacting or behaving, thus causing choice, and stimulation for the brain and/or body.

Application - Architecture as a Theory and Practice

Affordances in relation to architectural theory can be used as a “conceptual framework to understand the relationship between environment and

Figure 38: MUNARI Routes in Midair, Francesco Librizzi Studio (2013)

occupants, especially with respect to form and function” (Maier, Fadel & Battisto, 2009). Maier, Fadel and Battisto argue that using the theory of affordance in architectural design can improve the design process and “express a relationships between two or more subsystems in which a behavior can manifest” (Maier, Fadel, Battisto, 2009, p.397). This suggests spatial relationships in addition to object or material properties are important variables to afford new actions, behaviours, uses or experiences. It also suggests that designing with affordance theory in mind will create new forms and new parameters for design.

This thesis questions and tests how affordance theory can be applied to residential design which carefully considers proximities, relationships, and movement. The research provides a foundation which is grounded in material applications, and this thesis explores the spatial and sensory potentials of affordance theory in addition to the material.

Application - Sensory Integration

The physical layout of an environment can play a critical role in enhancing sensory integration (Atmodiwirjo, 2014). To afford actions through sensory integration, spatial and non-spatial variables must be considered such as access to light, air, views, and biophilia, in addition to opportunities for a variety of interactions and movements. Layout of space is important in determining how the environment supports affordances and how sensory

integration is created. Positioning of spaces and objects in relation to the body, and the relationship of several spaces and objects in combinations, are important for understanding the design or sequence of affordances (Atmodiwirjo, 2014).

ARCHITECTURE OF MOVEMENT, CHANGE AND VARIETY

Over the years, Architects have challenged and questioned our standard practices, approaches and perspectives of architecture. Architect George Teyssot questioned an important aspect of what it means to inhabit, as mentioned in Section 2: *A Case for Movement and Variation*, in his revelation that there is a relationship between the two words habit and habitat – stating that habitations are actually places for long habits (1996). This revelation reveals that designers have assigned a normative architectural notion that habitations (homes) are places of repetition and are static, highlighting that our conditioned ways of living do not spark variety of space and use, engage the body, or provide variety of spatial opportunities. To develop new architectural forms and behaviours, affordances which provide spatial variation and movement, allow users the ability to be active agents in manipulating space. It is important to avoid our actions becoming habituated since our “brains stops fully participating in decision making” (Duhigg, 2012, p.20), further decreasing our well-being.

Bernard Tschumi

Architect Bernard Tschumi writes in his 1996 book *Architecture and Disjunction*, forward-thinking ideas on spatial variation and its ability to allow our bodies to move and behave in ways which our current architecture has restricted. His ideology suggests that designers need to think about architecture as more dynamic and flexible, and re-think programmatic relationships through his concept of disjunction, such that architectural rigidity is avoided, and new relationships emerge. For example, what Tschumi describes as Disprogramming allows two programs to be combined where the spatial configuration of one space contaminates the program of the other and its possible configuration (1996, p.205). This allows for new variety of spaces, and their respective use(s). The question of limits is important since not all spaces should follow his rules of Disprogramming, and not everything

Figure 39: Maquettes of Bernard Tschumi's Parc De La Villette Folies: breaking architectural rigidity, offering new interactions

in architecture needs to be constantly on the verge of change.

Greg Lynn

Architect Greg Lynn pushes the notion of how to create architecture of change and variety. In his essay titled “The Folded, the Pliant and the Supple”, Lynn describes ways of approaching architecture where space can become more dynamic through the complexity and flexibility of what we design (1993). For Lynn, his new type of architecture which he calls a pliant and flexible architecture, “exploits connections between elements within a design” (1993, p.30). This is an important concept for designing affordances since connections which provide ranges of opportunities can afford a variety of spatial conditions and uses of our bodies.

In this thesis, Teyssot, Ong, Tschumi, and Lynn help to provide a conceptual basis for driving ideas of the thesis that shape a new conception of active design, where our bodies are more active and spaces become more varied. How we live changes, and people live differently in the same spaces. By providing a standard un-modifiable, spatially limiting residential unit, we further begin to engage with space less, limiting the ways which we can move and live.

ACTIVE LIVING FOR WELL-BEING

Active Design

Gayle Nicholl, Dean of the Faculty of Design at OCAD University, Toronto, advocates for active design and how “good design can improve health by encouraging physical activity” (INSTUDIO, 2017). Through case studies presented in her publication *Active Design: Affordable Designs for Affordable Housing*, Nicholl discusses active design strategies which can be seen in:

Case Study 4: Harlem, New York: **Figures 40 and 41**. This study helps to inform how bodily movement is important for our brain development and physical health. The design of an elongated rooftop deck incorporates an active challenge path that is to supplement community spaces on the floor (OCAD University, 2013) -- providing ranges of active opportunities with varying levels of challenge. **Figure 41** shows a conceptual perspective of the challenge path which is intended to provide opportunities for the 3 main

CASE STUDY 4

PROPOSED ACTIVE SECOND FLOOR PLAN

Figure 40: Proposed Plan, Gayle Nicholl

Figure 41: Proposed Challenge Path, Gayle Nicholl

MANIPULATIVE MOVEMENT

Develops fine-motor skills and coordination and involves controlled use of the hands and feet. Examples of manipulative movement include:

- 1 Grasping
- 2 Throwing and catching
- 3 Ball footwork

NON-LOCOMOTOR MOVEMENT

Develops balance and coordination skills and focuses on the relationship of the body to a place or object. Examples of non-locomotor skills include:

- 1 Balancing
- 2 Pushing and pulling
- 3 Twisting
- 4 Sitting and rising

LOCOMOTOR MOVEMENT

Develops gross motor skills and constitutes any movement of the body from place to place. Examples of this type of movement include:

- 1 Crawling
- 2 Walking
- 3 Running
- 4 Stepping
- 5 Skipping and jumping
- 6 Climbing

types of physical movement which are important for our well-being (OCAD University, 2013):

- Manipulative movement: Develops fine-motor skills and coordination and involves controlled use of the hands and feet
- Non-Locomotor Movement: Develops balance and coordination skills and focuses on the relationship of the body to a place or object
- Locomotor Movement: Develops gross motor skills and constitutes any movement of the body from place to place

The intervention allows for a space which has challenging dimensions to allow a variety of movements, through transforming a passive and underutilized space into a space full of active opportunities (OCAD University, 2013).

Movement

In a Harvard Architecture Graduate Thesis by Lauren Friedrich, Friedrich explores new relationships between architecture and healthy living (Pazzanese, 2016). She questions how architectural design can reorient spaces that challenge our physical skills instead of limiting the movements that can help support better health (Pazzanese, 2016). She discusses her findings on movement and well-being, stating “over time, we can become over-reliant on its comfort, losing our dexterity and our ability to withstand even the slightest discomforts. So what is meant to help us may, in fact, hinder us by making things too easy, removing all physical challenges and other stressors that are essential for optimal health” (Friedrich in Pazzanese, 2016). A key design strategy Friedrich discovered is the re-orientation of spaces so that physical skills are “challenged and encouraged, rather than minimized”, and the importance of creating well-being for our bodies through movement (Friedrich in Pazzanese, 2016). New movements and spatial orientations can help to inform new forms of architecture, as seen in **Figure 42**. Friedrich states “there are three ways to ascend or descend a building: stairs, elevators, or ramps. But what about climbing? What about sliding? What jumping or crawling or rolling?” (Friedrich in Pazzanese, 2016). New architectural forms can create new movements and behaviours, and the ways which our bodies can interact with space is an important variable in creating new ways to design for well-being.

Figure 42: Illustrations and model photographs of Friedrich's thesis project on architecture and healthy living, Lauren Friedrich

Social Well-being

Physical activity is good for our well-being beyond just our physical health. Being active can improve our cognitive health, physical, and social well-being. As cities become more densely populated and greater amount of people are living in apartment housing, loneliness is a large concern which poses a threat to our physical, mental and social well-being. Loneliness, however, can be decreased when opportunities for interaction and activity are available (Yanguas, Pinazo-Henandis, & Tarazona-Santabalbina, 2018). In an attempt to help reduce declines in our well-being such as loneliness, apartment housing designs should consider their forms, relationships and spatial and programmatic opportunities which can create social well-being through active living. By creating active lifestyles which involve communal spaces, amenities, and activities; meaningful relationships can be established. It is in the absence of loneliness, that our mental and physical well-being can be strengthened.

The design of our environments which we live in can foster social well-being, in addition to relationships which establish public and private gradients. Proximities of physical distances, views, and shared programs are also essential for active living since they can physically and socially engage residents. Simply by being active, “we create opportunities for interaction and social connection”, and it should be noted “physical distance is a major factor of social influence” (Chimel Architects, 2016). In addition, furniture arrangements and spatial layouts can encourage social interaction (Chimel Architects, 2016).

Shared Living - Mending Physical and Social Well-Being

It is apparent there is a link between active lifestyles and social well-being. For a new typology of mid-rise apartment housing, this link should inform a new way of living which promotes active lifestyles. Co-living, or shared living, can increase activity and social connectivity. When we share aspects of our daily lives through gradients of public and private spaces with others, it transforms how we live (Coldwell, 2019). Shared living is “a move away from the idea that your private space is the end of your living experience.” (Coldwell, 2019), and balancing private and shared space is essential but must be carefully designed. **Figure 43** shows a co-living development in

Figure 43: Marmalade Lane has a central common house, where members of the community can eat and socialize, as well as other communal spaces such as a gym, laundry, meeting rooms and a garden

Cambridge which shares a central common house “providing a focal point where the community can eat together and socialize” (Coldwell, 2019).

Interaction Design Approach is a way of designing for improving social relationships (Mamaghani, Asadollahi, & Mortezaei, 2015). Good social relationships and spaces can exist when there is continuity and easy access to them (Mamaghani, Asadollahi, & Mortezaei, 2015), as well as comfort

Figure 44: Example shared common space between private dwellings among larger group of people

Figure 45: Example immediate interior shared common space among small group of people

and attraction, as they manifest through good spatial and sensory qualities. These qualities can be created from good daylighting conditions, access to light, air, biophilia, and public and private gradients. Mamaghani, Asadollahi, and Mortezaei, 2015 state “common activity spaces are the most important parts of a social system” (2015), and this supports why active lifestyles are social lifestyles too. To create good shared spaces, there should be “desirable conditions for movement in space, rotation and participation in social and recreational activities”, such that “if the places are attractive for performing activities, other activities such as playing, social activities and social interactions will increase growth opportunities” (Mamaghani, Asadollahi, & Mortezaei, 2015).

SUMMARY OF FINDINGS: INFLUENCES FOR DESIGN EXPERIMENTS

In summary of the key literature and theories, key findings for creating new architectural forms which foster active living are as follows:

- composition and layout of surfaces and space constitute what opportunities they afford - more flexible and programmatic instability or blending can afford different opportunities
- for social and active engagement, balance between opportunity and action should be offered through providing choice instead of forceful patterns, movements or behaviours
- spatial relationships must be considered in addition to material properties of spaces for affordances to have an impact on architectural design such as:
 - height and volume of spaces
 - high degree of access to light, air and views
 - interior and exterior relationships: thresholds and gradients of transition
 - public and private gradients within lived spaces
- relationships and proximities of spaces are important for active design that can create meaningful relationships and active opportunities
- for sensory integration spatial and non-spatial variables must be considered such as the objects and environmental qualities of the space
- limits to how flexible or how programmed or un-programmed spaces are, is important for affording certain actions and behaviours -- too much

instability counteracts the effectiveness of flexibility

- physical distances, views and shared programs are essential for active living which can physically and socially engage its residents
- comfort and attraction, in addition to continuity and ease of access are necessary to ensure that space is desirable and can afford engagement

These findings add knowledge to the thesis topic as it pertains to architecture and affordances, movement and variety, and active lifestyles for well-being.

PROCESS & DEVELOPMENT

DESIGN RESEARCH AS A METHOD

Through exploration in literature and case studies, design-research is conducted through drawing and diagramming in order to gain an understanding of the possibilities and limitations of creating active lifestyles in urban housing. Throughout the milestones of the thesis, research from literature and case studies followed by design and drawing exercises, and critical reflection, translate ideas into a medium suitable for the development of the design project. Topics including extensions of the home for physical and social opportunity are examined, as well as Missing Middle, questions of scales, affordances, and building forms for views, daylight, and activity. These topics contribute to design investigations which lead to the parameters and ideas of the final thesis project. The explorations help to develop design ideas about:

1. How urban living doesn't have to limit what one can do in their private dwelling -- improved design can create variety of bodily movement and spatial experience
2. How new forms of housing can encourage new behaviours which improve well-being
3. How urban housing can provide public and private gradients between neighbourhood and city – creating thresholds and interstitial active/social zones

The following sub-sections examine the relationship between theory, precedent and design research exploration, highlighting findings which inform the thesis project.

VARIETY: FLEXIBILITY FOR MOVEMENT AND SPACE

This Thesis analyses housing from a perspective of well-being through architectural strategies that encourage active living. Movability, flexibility and variety of both body and space are typically neglected in Toronto apartment housing, and can be better developed to improve well-being. Combining Affordance Theory and application of interior flexibility within lived spaces, attention is brought to bodily and spatial variation for well-being. The following design research tests how a new approach can use housing as an instrument which improves our lived experiences.

Figure 46: Ryerson University's SLC Entrance

Figure 47: Ryerson University SLC from Gould Street

Affordances

Affordances do not have to be simply an object or material quality that affords different opportunities for interaction such as Gibson suggests; they can also manifest through spatial relationships that afford new behaviours or experiences. The entrance 'stairs' to Ryerson University's Student Learning Centre is an example of an object or material affordance which physically affords the user choice to use the stairs as a place to sit, climb up the steps, walk up ramps, or as pictured in **Figure 46**, skateboard on. This is because its physical and material qualities consist of varied surfaces that are slanted and flat, as well as varied height and depth of physical steps that afford different actions. The steps are not movable, but they afford a variety of actions.

In this thesis, the combination of spatial and material affordances as it pertains to new housing forms which create new actions and behaviour are examined. **Figures 48, 49, and 50** are a result of critiquing conventional apartment design in Toronto that follow particular patterns of repetition, sameness, lack of variety – with all functions and spaces on one plane,

Figure 48: Interweaving Spaces

Typical Condo: Sameness, Repetition, Stacked

Figure 49: Typical Apartment Organization

Interweaving Homes:

Figure 50: New Form of Dwelling: Interweaving

and volumetrically consistent. In an effort to incorporate movement and variety into space the exploration look at spatial affordances in the home -- spaces which interweave, stagger and afford different orientations, views, elevations, and ways for transitioning which allow the body to behave in, use, and experience space differently. Conventional apartment design needs to be challenged, and questions around spatial volume, orientation, light and circulation need to be addressed to create new forms and relationships.

Bioscleave House

Arakawa and Gins, New York, 2008

Bioscleave House by Architects Arakawa and Gins is an example of a home that challenges the typical conventions of interior lived spaces. The house is designed to make people use their bodies in new ways that stimulate –

and its intentions are to strengthen the immune system and improve well-being (Reversible Destiny Foundation). Its bumpy and uneven surfaces also allow for the three main movements for well-being and development to be challenged such as locomotor, non-locomotor and manipulative movements as seen in **Figure 56**. Spatially, since floors and elements are at different levels with a range of views and perspectives, the design is stimulating and varied. Although this is a single family home, it is inspiring how movement and challenge is created, and this knowledge can be translated into other interior environments.

CHALLENGING ALL SKILLS

Figure 56: Challenging All Skills, Analysis Drawings of Bioscleave House, by Author

KUBE House for Culture and Movement

MVRDV, Denmark, 2016

KU.BE House of Culture and Movement is an example where active opportunities are expressed both spatially and materially. High ceilings, access to daylight and the range of surfaces and elements help to promote activity. The building blends “theatre, sport and learning where body and mind are activated” (Frearson, 2016), and spatial blendings and relationships afford new activity and movements. The project consists of six main volumes which allow for “users to shape them” -- there are “fast paced rooms and Zen rooms and in-between the volumes is where the real fun exists” (Frearson, 2016) – as shown in **Figures 57**. Frearson also mentions that “the route through the building focuses on developing and encouraging alternative forms of movement” (Frearson, 2016). Although it is not a housing precedent, its attention to spatial and material affordances for movement are inspiring and can be translated into housing design.

Figure 57: Series of Photographs and Drawings of KUBE House of Culture and Movement

Movement and Circulation

Active opportunities can exist through physical and spatial affordances as it pertains to relationships, dimensions, experience and behaviour. **Figure 58 and 59** is a design research study which addresses circulation space, challenging how our conventional ways of moving through housing could become more active while providing choice to different actions or experience. The study reveals there are limits to how active common circulation routes should be, and how long the path of travel is. There needs to be choice and ability to not be forced to walk, climb or move in other ways for too long of a duration. The study also reveals that in mid-rise housing, circulation spaces should allow for a variety of activities if they are to go all the way from grade, to the highest level. Design variables for circulation spaces include varied program spaces at different floors for places of pause and interaction or alternative activity. Challenging our bodily movements through a variety of ways of transition further encourages our well-being.

Figure 58: Active Circulation Study, By Author

Figure 59: Movement Analysis, by Author

INTERNAL FLEXIBILITY

Maison De Verre

Pierre Chareau, Paris, France, 1932

Internal flexibility is also an important variable for active living when seeking spatial variation. Maison De Verre by Pierre Chareau exemplifies spatial division through the use of sliding, folding or rotating screens, an overhead

trolley from the kitchen to dining room, a retracting stair from the private sitting room to the bedroom (Maison de Verre, 2020). Movable elements which engage body with its environment allow for physical movement as well enables the body to become an active agent in creating spatial variation. Spatial flexibility affords more uses, as well can require the body to initiate action. Through flexible spaces, body and space are active and impose variation on one another.

Dwelling Study 2: Spatial Flexibility

As described in greater detail in the Appendix: *Design Research* section, *Dwelling Study 2*, this exercise explores the role of spatial flexibility for creating alternative ways of experiencing and behaving in urban apartments. The study focuses on improving the quality of the apartments by allowing access to light and air and creating active opportunities through flexible, and customizable elements. The spatial qualities such as 3 orientations to daylight, light shelves for greater daylight dispersion and transformability of living spaces for alternative uses, help to promote active lifestyles through immediate connection to views of the city. **Figures 63, 64, and 65** show some of the spatial transformation and bodily movements which can exist in the apartment due to this new form of apartment housing.

Through these investigations, design parameters and spatial manifestations inform how apartment housing can allow people to be more active, and afford new experiences and behaviours in space through variation.

Figure 63: Flexible Plan, By Author

Figure 64: Flexible Interior in Section, By Author

Figure 65: Live, Work Play, By Author

FORM: NEW BEHAVIOUR AND EXPERIENCE

Views, Biophilia, Light and Air

The thesis argues for the design of mid-rise apartment housing to be better developed so human well-being can be improved. Variables for such development include allowing multiple orientations to daylight and providing greater access to air, views and biophilia. To explore a new conception of mid-rise urban housing, a balance needs to be made between movement and variation while allowing choice for spatial flexibility and physical activity.

Bloc 10

5468796 Architecture, Winnipeg, 2011

Bloc 10 by 5468796 architecture is a precedent which informs how unconventional housing forms can afford improved well-being and experience through design. Interlocking units, as seen in **Figures 66 and 67**, mix “several different living typologies within a flexible stack of volumes” (546879 Architecture, 2012). Each unit is multi-leveled and interlocks with its adjacent units, interweaving to allow for multiple orientations of daylight. The system allows for views in several directions, and cantilevered walls that create offset overlapping balconies or extended rooms (546879 Architecture, 2012). **Figure 68**, shows the relation between the ideas extracted from this precedent, and the design exploration for dwelling study 2 as it pertains to its form, qualities, and organization. It is important to think about how the quality, and opportunities provided to us within our environments, influence how we behave and live active lives.

Star Apartments

Michael Maltzan Architecture, California, 2014

Unconventional forms can add another dimension to active living which includes the social aspect, as found in Star Apartments by Michael Maltzan Architecture. This project stacks prefabricated modules to create improved daylighting conditions within the dwellings, while creating platforms for social interaction which frame a shared courtyard that looks onto shared amenity spaces below. **Figure 69** shows the organization and relationships of shared space, private dwelling and circulation. People can become more active and engaged with their communities and neighbours when social opportunity is afforded. It is can be difficult to separate active and social from one another, and this thesis explores how the two coexist to foster well-being. **Figures 72, and 73** are analysis drawings which extract the key ideas of the project. A shared anchor as well as presence of unprogrammed communal balconies show how gradients of programmed and unprogrammed space can afford different social interactions. A high degree of visual connectivity as seen in **Figure 73**, is created between each dwelling and the inner courtyard. Although the units are small, the private unit has access to shared communal spaces and is visually connected to the other residents. Social connectivity creates opportunity for activity and should be a highly considered variable in this new conception of urban dwelling.

Figure 66: Bloc 10 Units

Figure 67: Bloc 10 Massing

Figure 68: Dwelling Study 2 Unit Forms

Figure 69: Star Apartments, Axonometric of Organization

Figure 70: Star Apartments, Elevation

Figure 71: Star Apartments Aerial View

Figure 72: Analysis Drawings by Author

Figure 73: Analysis Drawings by Author

Active Lifestyles and Well-Being

New forms of housing can create new design relationships, behaviours, experiences and uses. Connection between the private dwelling and the public city require careful attention, for example: gradients between public and private thresholds. Considering this is important for developing design parameters which foster physically and socially engaged living while addressing the concern of privacy. A useful design variable for active lifestyles in mid-rise housing is scale and the range of opportunities different scales afford for connections between residents, the public, and to street

and city life. Questions of typology, form, gradients, thresholds, affordances and relationships are critical to form a new conception of mid-rise housing.

NEW ORGANIZATIONS AND RELATIONSHIPS: QUALITIES, ORGANIZATIONS AND AMENITY

Relationships between private dwelling and city, and body with space, are important to consider when designing for active living. Different scales require different questions and variables to be addressed through design. Through design research explorations, new relationships, qualities, and organizations of dwellings are discovered, and can be used as design tools. It is important to consider the question of amenity space in this new conception of active housing, and that shared living can be an agent for active living.

Dwelling Study 1: Body, Spatial and Sensory Variety

Getting people to move their bodies in different ways while allowing living spaces to be less prescriptive, allows people more autonomy to shape their habitual spaces to suit their lifestyles and their unique bodies. Blending spatial experiences and creating variation of movement and use reveals unconventional ways which dwellings can be organized, and that new relationships between space and use can emerge. In an attempt to eliminate our bodies slipping into the automatic, this study examines how all three main physical movements are incorporated as seen in **Figures 74 and 76**. Analysis of the dwelling design reveals that light and air are shared among levels and prove to create better living environments and spatial variation. Hybrids of spaces and their uses as seen in section in **Figure 76**, and in plan in **Figure 76**, form variation of experience and potential for various actions. Spaces which strive to be multi-functional or support a variety of programs begin to inform spatial relationships and experiences. When designing with hybrids in mind, the quality of the dwellings begins to change, and can focus greater on the well-being aspects of the inhabited spaces.

Relationship to Grade and Street Life

Establishing a relationship with grade and street life is essential for mid-rise buildings that connect residents and the city together and afford physically and socially engaging opportunities. This is why a new type of 'Missing Middle'

Figure 74: Movement in Section, By Author

light air heat vegetation view

Figure 75: Senses in Section, By Author

BODILY MOVEMENTS

Level 3 | sleep/lounge/dine/entertain

ZONES & HYBRIDS

Level 3 | sleep/lounge/dine/entertain

LEGEND

Figure 76: Bodily Movements, Zones and Hybrids. By Author

housing is explored. Courtyard housing also proves to allow this connection, as it can provide opportunity for social interaction and community (Figure 77). Social inclusion is examined, shown in **Figure 78**, and how active opportunities inside and outside of the dwelling can create physically and socially engaging spaces. Examination of both interior and exterior shared spaces inform how scale and thresholds are critical to determine gradients between public and private. In addition, these gradients can work to allow smooth transitions between housing and the city, creating extension of the home, as diagrammed in **Figures 79 and 80**. Opportunities for activity can occur beyond building, in-between buildings, and inside buildings. Visual

Figure 77: Courtyard Housing: Opportunity for Social Interaction and Community By Author

Figure 78: Social Inclusion in and Outside of the Home, By Author

Figure 79: Extensions of Home,
By Author

Figure 80: Building Scale and
Connections, By Author

Figure 81: Mid-rise Connection,
By Author

connectivity is important, as it can relate to the human scale. These connections should be encouraged to connect people and buildings with grade activity as shown in **Figures 78 and 81**.

Design Project: First Iteration

The first iteration of the design project applies these new relationships, qualities and organizations into a proposal which covers an entire city block. This affords an atypical available extent of horizontal space for a mid-rise building that can accommodate a variety of common indoor and outdoor spaces, and relation to grade which encourages activity. Stacked and staggered dwellings form clusters of housing called dwelling blocks which step down to allow improved access to light, air and views. Active opportunities inform the organization of circulation and relationships of

Figure 82: Axonometric of Housing Proposal

Figure 83: Fragment of Housing Proposal: Dwelling Blocks

Figure 84: Shared Circulation and Communal Core

as the building whole, and a fragment of the building where dwelling blocks back onto a shared outdoor terrace referred to as a “street”. The private unit is attached to a shared circulation and communal core which only the residents of the dwelling block share, and the shared core is connected to communal amenity spaces among all residents of the building. Transitioning from private (dwelling unit), to semi-private (shared core), to fully public (shared amenities among all residents) informs that a design project requires design parameters and variables at each of these scales that create active and social opportunities (**Figure 84**). Ramps connect the “street” to the courtyard which is an active public space shared with the city. Upon

reflection, the ramps were too long and circulation from the housing down to the courtyard provided only one option – through an excessively long ramp. Learning from this, a new design iteration; the final design project will address these issues and focus on 5 critical scales.

INFORMING THE PROJECT SCALES

The investigations help to inform the five scales which this thesis is developed through: 1: Scale of the Private Dwelling, 2: Scale of the Immediate Shared Vertical Space, 3: Scale of the 'Neighbourhood', 4: Scale of the Building Whole and Shared Spaces, and 5: Scale of the Site as it Integrates with the City. A detailed look of the findings on the scales are as follows:

Scale of the Private Dwelling

Understanding of how to create movement and flexibility and access to daylight and views while respecting the need for privacy helps to understand how private dwellings can be designed to improve variety of space and bodily movement. Parameters around views, daylight and affordances inform the physical form of the dwellings and how they cluster together to create a block.

Scale of the Immediate-Shared Vertical Space

This scale informs how proximity of shared spaces among a small group of residents can spark interaction and can also be a place which initiates action but provides choice. Stairs are encouraged over elevator use, however people have the option. Rock climbing walls and net floors create choice for varied experiences. The vertical core informs both physical and social engagement while providing access to daylight, views, and interior/ exterior access.

Scale of the Neighbourhood

This scale informs how a cohesive unit of dwelling blocks can form its own sense of social and physical engagement through active outdoor space for gardening and social activities, and close-knit engagements. The neighbourhood has direct access to the courtyard, and views onto

Figure 85: Preliminary Building and Site Massing Model, 1:500

Figure 86: Fragment Massing, 1:100

the city from the rooftops of each dwelling block, further strengthening the relationship between housing and the city. The neighbourhood focuses on how groupings of dwellings can form active and social lifestyles as a gradient between the city and their private dwelling.

Scale of the Building and Shared Spaces

The shared spaces among the entire building are important for fostering well-being and active lifestyles since there are key shared spaces such as laundry, mail, and amenity spaces such as gyms and community spaces that are critical for social and physical engagement in urban living. This scale informs how neighbourhoods and their shared spaces can create active engagement and social interactions between a variety of residents.

Scale of the Site and City

The scale of the site, particularly the courtyard and the portals which connect the site with the surrounding city is important since urban housing is not something that stands alone – it is part of the fabric of the city and should be treated as such. By creating an engaging courtyard with variety of opportunities for walking, biking, running, sitting and social gathering, active opportunities are present and inviting to not only residents of the housing,

Figure 86, Enlarged

DESIGN

06 DESIGN

This section of the thesis covers 2 main areas of design:

1. Site investigation/typology
2. Design project

As a result of literature review, case study analysis and design research explorations, the design project applies this new knowledge to the design of a mid-rise courtyard housing project in Toronto. The design project carefully examines its context and relationship of the project site with the surrounding city. Our lived experiences do not stop at the facade of our housing, rather the design reveals how active lifestyles can be fostered through connections between housing and city.

This thesis questions and tests how affordance theory can be applied to residential design which carefully considers proximities, relationships, and movement at 5 critical scales. The research presented establishes a foundation which influences new variables for design which incorporate physical, spatial, and sensory variety. This thesis investigates a new conception of active dwelling focusing on:

- Flexible and varied living environments which engage the body to move in more ways than typical apartment housing
- Social interaction opportunities adjacent to the private dwelling, and as an extension of the dwelling
- Emphasis on stair use that is tied to social spaces – incorporating daily active behavior
- Alternative routes of circulation providing variety and choice for experience and use of spaces – nudging people to walk more and be active, but not forcing to do so by providing a variety of options for circulation and activity
- Human scale relation with front doors at grade and connection to street life
- Views to nature
- Multiple orientations to daylight
- Proximities between shared and private living spaces

07

SITE INVESTIGATION

TPOLOGY

183 Front Street East, Toronto

The specific design investigation examines a highly vibrant downtown site which is encouraging with its diversity of programs such as food, entertainment, community, play and more. The design investigation examines how residential architecture can engage more active lifestyles, while actively creating relationships with the built form with the surrounding city.

The project site selected is a rare site in the city that affords design agency due to a large extent of horizontal space. The site affords the development of a new approach to mid-rise housing with a variety of common indoor and outdoor spaces, relation to grade and street/city life to encourage activity and create social variety that is important to human well-being. The parti - favours walk up options over elevators and stair use while offering a range of natural lighting conditions during the day and views to neighbours.

DESIGN STRATEGIES

Some design strategies which investigate the courtyard mid-rise typology connecting within its context and city fabric to encourage activity and movement are:

- connection to street
- attention to entry points through the housing development/courtyard and to the city context through 'portals'
- improved pedestrian access and flow through new cross-walks which align with portals and views to the courtyard and park along The Esplanade
- opportunities for active and passive activities, such as biking, walking, sitting, play
- multiple orientations to entry to the courtyard

BACKGROUND AND HISTORY

The St. Lawrence neighbourhood has gone through phases of development as former industrial lands were turned into a lively, community focused neighbourhood. In the 1970s there was an experimental period of housing

Figure 87: The two principle design elements of St Lawrence Neighbourhood: traditional, street-facing urban townhouses and mid-rise apartment blocks, both taking shape c.1980. Canadian Architect, June 1981.

Figure 88: Crombie Park, the centre and heart of the St. Lawrence neighbourhood

which brought new design principles. The neighbourhood is “a high density, socially mixed community in the centre of downtown Toronto” (CEDRO, n.d) and during this period in the 1970s, the provincial and municipal governments encouraged new policies so that new neighbourhoods could allow for new activity (CEDRO, n.d, p.2). As city living was considered unsanitary, the development of low-rise human-scale, pedestrian friendly walk-ups and cooperative housing establishments became experimental period which created one of “Canada’s most dynamic inner-city neighbourhoods” (CEDRO, n.d, p.1). In a response to the historical context of the neighbourhood, the thesis project strives to further allow for new activity while respecting the current mid-rise typology of its surrounding neighbours, and continue the dialogue of experimentation of community oriented, human-scale, livable housing.

SITE ANALYSIS

To expand on the historical analysis discussed, the St Lawrence neighbourhood has great historical character through its “architecturally significant 19th Century Georgian style red and yellow brick buildings [which] line Front Street” (Toronto Neighbourhood Guide), and its mix of amenities, activities and overall diversity. The neighbourhood has a great demographic mix and housing diversity which favour lower-scale buildings.

The site of the thesis project is about half way between the St. Lawrence Market, and the Distillery District -- two vibrant areas within the city that promote entertainment, local food and active lifestyles. The St Lawrence market is a “landmark for Old Downtown Toronto, and has over 200 vendors, is a frequently spot to go to by tourists and locals, as well is a very “family-friendly neighbourhood “with residents of “mixed incomes and many different cultural backgrounds” (Toronto Neighbourhood Guide).

Figure 89: St Lawrence Neighbourhood

The thesis project respects the context of the neighbourhood to fit in yet offer something new. Connections to existing laneways and the parks to the south of the site along the Esplanade further enhance opportunity for active lifestyles and integration with the city.

SITE ANALYSIS

IN NEIGHBOURHOOD

- Shopping/Entertainment
- Parks & Outdoor Space
- Health
- Religious/Spiritual

OUTSIDE NEIGHBOURHOOD

- Shopping/Entertainment
- Parks & Outdoor Space
- Health
- Religious/Spiritual

- Waterfront
- Site

- Neighbourhood Boundary
- Streetcar Route
- Bus Route
- Subway Line

** Not all instances are labeled: overall great access to services in this neighbourhood

The chosen site allows for a larger scale site intervention, and ability to give back public space to the city. Connection to surrounding context, attention to entry and through-way conditions engages the city and residence into active lifestyles. The site analysis above shows the diversity of the neighbourhood, affording a large range of opportunities for engaging with city life.

RESPONSE TO CONTEXT

To respond to the context of the neighbourhood, neighbouring mid-rise courtyard housing developments are analyzed to gain an understanding of what aspects are successful, and those which are not. This analysis informs design decisions for a new typology and form of mid-rise courtyard housing for active living.

31 Nicholson Lane

observations:

- public space made public with large entry, but no way through site
- entrance not highly welcoming
- garbage disposal blocks entry
- cars block visibility to the park in the courtyard
- entrance along alleyway: no signaling to public point of entry
- extruded form, flat facade, unoccupied roof

amenities:

- playground
- small gardens
- few benches
- trees
- waste disposal

building form:

- U shape

130 Lower Sherbourne Street, Toronto

observations:

- L form allows for flow through from multiple orientations
- access visible by a main street
- small entry points through building do not provide great visibility/invitation to courtyard
- lacking activity in courtyard, mainly outdoor paved space for walking and storing recycling/garbage
- extruded form, flat facade, unusable roof

amenities:

- paved walking paths
- trees
- waste disposal

building form:

- L shape

Edgeview Housing Cooperative 112 George Street South, Toronto

Figure 90

observations:

- ramp at south end of courtyard allows public access
- access courtyard through laneway: no visibility to entrance
- extruded form, flat facade

Figure 91

Figure 92

amenities:

- community gardens
- green space
- trees
- some benches
- roof terrace

building form:

- U shape

Critiquing The Neighbouring Multi-Family Housing Context

The types of multi-family residential towers in this neighbourhood are primarily mid-rise courtyard housing which aim to provide public outdoor amenity space. Most of these towers are extruded forms which repeat their floor plates from the ground level up, and provide public access to the courtyard spaces.

These public outdoor spaces typically provide few amenities some which include a playground, benches, community gardens, walking paths and greens pace. The variety of activities which take place in this courtyard are limited since typically their qualities and connection with the city and public is poor.

31 Nicholson Lane is a good example of issue of visibility to the public entrance to the courtyard space. Also, the shape of the building is a U shape, and lacks providing multiple entry points to the courtyard: there is only one entrance via Nicholson lane, a laneway which garbage disposal is placed in addition to parked cars, cutting off visibility of the public to the courtyard. There is also the issue of invitation: the lane does not invite or signal entry to the courtyard. The building's form also contributes to this since it is an extruded flat form with no variation or relation to the human scale.

More activities can happen in courtyard space if the opportunities are provided. 130 Lower Sherbourne only provides paved spaces with some trees for walking, and Edgeview Housing Cooperative's ramps at the south end of its courtyard are not very inviting and like 31 Nicholson Lane, the access to the ramp is along laneway: little visibility and invitation to access the space.

The active amenities of the surrounding courtyard housing towers are lacking in diverse functions and in their visibility and accessibility. To be improved, the following parameters could be addressed:

- multiple points of entry to shared outdoor space
- invitation to entry points through outdoor space, scale of built form, materials, colours and textures
- visibility from shared outdoor spaces to street
- use of roof level as a visual and/or physical connector between residents and the city: visually connect city activity
- variation in building form and human scale connection
- variety of potential active opportunities

Responding to Site Factors

The design proposal responds to the critique of the neighbouring courtyard housing. The intervention allows multiple orientations of entry to the courtyard, and ability to travel through one side to the other, cutting through a city block opposed to going around it. The red lines show the entry points of the courtyard and their connections to the surrounding context.

08

DESIGN PROJECT

PROJECT DESCRIPTION AND SCOPE

The thesis examines different scales which urban dwelling can engage the body and create variety of space and use. The design project is developed through the following five scales which urban dwelling can engage the body through private and shared living environments. These 5 scales are:

1. Private Dwelling
2. Dwelling Shared
3. Neighbourhood
4. Building Shared
5. Courtyard-City Connection

At the 5 scales, the design will inform how active lifestyles can emerge through a new form of urban dwelling, through carefully considered proximities and relationships that create movement and variation.

Design Proposal

The form of the building affords greater daylighting conditions and access to light, air and views. The housing blocks are grouped into “neighbourhoods” allowing smaller groups of people to connect and share -- creating meaningful relationships. By providing an outdoor semi-public gradient between the housing blocks, referred to as a ‘street’, active and social opportunities exist and provide a sense of comfort and choice to interact outside of the home, but between the home and the city. The courtyard further extends active opportunities of the home and allows for public interactions, access to green space and biophilia, and places to play, relax and exercise.

BUILDING FORM AND SITE: AXONOMETRIC VIEWS

north-west axonometric

south-west axonometric

CONCEPT DIAGRAMS: BUILDING FORM AND SITE

BUILDING MASSING: STEPPED/
STACKED FORM FRAMING COURTYARD

NEIGHBOURHOODS

'STREETS'

COURTYARD

PROJECT SCALES

4 BUILDING SHARED

5 COURTYARD-CITY CONNECTION

Scale: Private Dwelling

1

PRIVATE DWELLING SCALE

At the scale of the private dwelling, flexible and varied environments are created to initiate action and movement while allowing variety of space and use. Through flexible interior elements such as adjustable walls, beds, and loft spaces, people interact with their living spaces more actively. The form of the dwellings and their stacking and orientations, affords greater access to daylight and views while respecting the need for privacy.

This scale examines the following, and highlights the active designed elements of:

- **context**
 - neighbourhood
 - dwelling blocks: shared vs private, indoor vs outdoor, entry
 - sample dwelling block organization
 - sample unit types
- **unit design: sample units**
 - one bedroom, 1 level
 - two bedroom, 2 levels
 - three bedroom, 3 levels

CONTEXT

Fragment of Building: Axonometric of 1 Neighbourhood

The private dwellings are a component of a dwelling block, which is part of a 'neighbourhood'. This grouping of dwelling blocks vary in height allowing stepped facade for access to views, light and air. There are two types of dwelling blocks: 1) Urban street facing, and 2) courtyard facing -- both share a 'communal outdoor "street"'.

Dwelling Blocks: Shared Versus Private, Interior and Exterior Entry

Each dwelling block has a shared communal space for the residents (yellow). The private units (purple) vary in one, 2 and 3 levels.

Sample Dwelling Blocks

**MIXED BLOCK -
3 STOREYS**

**MIXED - MAINLY SINGLES
AND COUPLES BLOCK - 4
STOREYS**

**FAMILY BLOCK -
5 STOREYS**

Each private dwelling is designed so that its spatial qualities and orientation afford multiple orientations to daylight and views.

Sample Unit Types

3 storey block

3 storey block

5 storey block

UNIT DESIGN

Typical Units

Sample Units: 1 Bedroom, Plan

This unit is a one bedroom, one level unit. 44m²

Sample Units: 1 Bedroom, Section A-A

The one bedroom unit provides opportunity for sitting, standing, kneeling, stepping, reaching, climbing, and pulling. Movable elements such as tables, beds, and roof hatches allow for movement and spatial and sensory variety, while the staggering form of apartments allow operable skylights for ventilation.

Sample Units: 1 Bedroom, Section B-B

Built in tiered furniture that is movable allows for change and variety. Steps become a means of varying space as well as storage, and indentations in floors become a way of sitting and eating different from our traditions. The usability and degree of movement in this unit is much greater than typical apartments, and breaks past conventional designs focused on sameness, and being static.

Model Photographs - 1 Bedroom

Model photographs of a sample one bedroom unit, show window heights that differ depending on program and elevations within the dwelling.

Model Photographs - 1 Bedroom

The interior of the unit creates new motions such as stepping up and down, grasping and pulling tables and beds on pulleys, as well movable steps which reveal storage underneath. Small living can afford variety with clever use of space such as using floors for storage, and freeing up floor space for other uses.

Sample Units: 3 Bedroom, Plans

Level 1 of a three bedroom unit, 3 level unit. Unit = 128m²

3-4 people

3 beds

3 orientations to views/lighting

Bedroom Detail

The bedroom allows for a bed to become a place for sleeping, a private sitting room, or a boudoir. The design allows multiple uses of small spaces, improving the usability -- something typical designs do not afford.

Sample Units: 3 Bedroom, Plans

Three options for transition between levels of the apartment are provided: 1) spiral stairs, 2) ladders, 3) rope climbing wall.

Bedroom Detail

This bedroom is designed to reverse the motion of stepping into bed, and instead down into bed. Movable platforms can serve as a place to store personal items, plants, artwork etc.

Sample Units: 3 Bedroom, Plans

Loft space visually connects the two levels together while allowing daylight penetration to the floor below by the use of a net floor instead of a solid floor.

Loft and Retractable Net Details

Loft space, featuring net floor on the third level allows the use of muscle stabilizers since the rope has slight slack. Floors for leisure activities don't have to be solid, and the rope allows light, visual, and auditory connections to activity below.

Retractable climbing net between levels 2 and 3.

Sample Units: 3 Bedroom, Plans

Section A-A

The majority of Toronto apartments are one level, however when volumes are varied, they create a range of active opportunities and spatial experiences.

Sample Units: 3 Bedroom, Sections

Section B-B

Varied volumes also afford new sensory experiences from access to light, air, and views (see diagram on page 104).

Sample Units: 3 Bedroom, Diagram: Views, Light and Air

Section through three bedroom unit showing improved access to light, air and views.

Scale: Shared Dwelling

SHARED DWELLING SCALE

The scale of immediate shared space between the private dwellings creates active opportunities and social integration. This scale informs how proximity of shared spaces among a small group of residents can spark interaction and can also be a place which initiates action. Stairs use is encouraged, however elevators are provided for practical reasons such as moving, if someone becomes ill, etc. Rock climbing walls and net floors create choice for varied experiences while allowing for visual and auditory connections. To summarize, the vertical core informs both physical and social engagement while providing access to daylight, views, and interior/exterior access.

This scale examines the following, and shows the integration of active elements of:

- **dwelling entry design**
 - vertical shared space
 - entry to dwelling block and utility space

DWELLING ENTRY DESIGN: Shared between dwelling block residents

The scale of immediate shared space between the private dwellings creates active opportunities and social integration. Each dwelling block shares a utility space below, with shared living spaces above.

Dwelling Block Section Through Shared Space

The vertical space provides opportunity to eat together, move, and relax and transitioning between floors affords options: stair use, climbing wall, and an elevator.

Sample Core Plans - Neighbourhood A, Dwelling Block 3 (A3)

Dwelling Block Shared Space - Axonometric

Transitioning between floors affords options: stair use, climbing wall, elevator. Direct visual access to the city and other dwelling blocks are present at the front and back of each dwelling block -- further creating connection between residents and the city.

Axonometric and perspective views within the shared core.

Dwelling Block Experience

The image above is a rendering of the one of the levels of the shared vertical core between private dwellings. Materials, colour and views and spatial volumes create comfort and connection with each other, other dwelling blocks, and the public life which takes place in the courtyard.

DWELLING ENTRY DESIGN: Shared between dwelling block residents

Due to typically dull apartment entrances, the project provides each unit to have a shared entry which affords utility and storage space while providing a residential feel.

Dwelling Block Interior Entry/Utility: Plan

The above plan is the utility space for residents where they can store belongings, wash up bikes and pets, and have a space to allow more activity in their daily lives. Ease of access to such spaces can encourage people to get out more, since washing a bike for example, is not a hassle.

Dwelling Block Interior Entry/Utility: Sections

Section A-A

Section B-B

Sectional drawings further reveal the function, use and experience of this utility space.

Scale: Neighbourhood

'NEIGHBOURHOOD' SCALE

As presented previously, the private dwellings cluster into what is called a dwelling block, and a grouping of dwelling blocks form a neighbourhood. The groupings of housing further creates connection between residents; creating social and active opportunities. This scale informs how proximities are important variables for design for creating good living environments.

This scale examines the design and organization, and active elements of:

- **context**
 - neighbourhoods A-F
- **unit identities**
- **detailed design**
 - ground and second floor plans
 - dwelling configurations
 - sectional design through building
 - sectional design through block
 - neighbourhood 'streets': active and social opportunity

View of Neighbourhood C from Princess Street

NEIGHBOURHOOD DESIGN

Neighbourhoods A to F

'neighbourhood' scale

The design project consists of 6 neighbourhoods which establish relationships between street and city life, as well as resident connections. Neighbourhoods A, B and C are considered as “one building” sharing an ‘anchor’ where the main activity and amenity spaces are such as the gym, community meeting spaces, mail and storage lockers. Similarly Neighbourhoods D, E and F are a “second building” which is independent from the building which consists of neighbourhoods A, B and C, but functions the same. The two buildings (building 1: neighbourhoods A, B and C, building 2: neighbourhoods D, E and F) share a courtyard which is accessible to the public.

Unit Identities

View from Front Street East: Unit Material Identities

Since there are many volumes that shift and are oriented differently, an effort was made to break up the volumes of the dwelling units and add some variation. Each neighbourhoods dwelling blocks have feature wall of dark gray, red or beige brick to distinguish individuality of private dwellings. This creates sense of place and housing identity.

Neighbourhood Key Plans: First 2 Levels

Second Floor: Neighbourhood A

Ground Floor: Neighbourhood A

Enlarged Neighbourhood Plan - Ground Level

Enlarged Neighbourhood Plan - Second Level

Unit Types and Locations

The above plans show a range of units that have different orientations, views and number of levels. 1, 2 and 3 bedroom units are available, creating a good housing mix within the neighbourhood, and it's design in terms of proximities, relationships and organization are examined through the following pages of this section: *Neighbourhood Scale*.

Analysis of Neighbourhood Design: Relationships and Organization

Dispersion of people and units

The neighbourhood design consists of a cluster of dwelling blocks that share a communal 'street'. This 'street' acts as an interstitial outdoor active and social zone providing a gradient between the private dwelling, and public city. The forms, relationships and orientations of the private dwellings and dwelling blocks allow for better living conditions in relation to opportunities for interactions and levels of comfort and well-being.

Connections: Orientation and Organization

Orientations of the shared cores between private dwellings create relationships between context and residents. The activity within the cores are designed to afford privacy and comfort, while providing views to allow a sense of place within the city and within the neighbourhood. A3 and A4 face onto Front Street, a busy main street, and A1 and A2 face onto the courtyard. The spatial organization affords comfort and privacy due to the orientation and design of the housing forms.

Public and Private Relationships: unit orientations, views, proximities

Condition 1: private facing public

partial visibility

Condition 2: private facing private

staggered views

Condition 3: public facing public

direct views

Proximities

The organization of the housing forms allow relationships between private and public programs within the dwellings. 3 conditions exist as units face one another. The staggering forms allow for a fair distance between units, and private spaces which face one another, are designed to not have window heights at the same level to provide comfort and privacy while gaining access to light, air and views.

Neighbourhood Section A-A, Through Units and Neighbourhood 'Street'

A transverse section through Neighbourhood A shows the relationship between the private dwellings, dwelling blocks, and the shared communal 'street' which is shared between, acting as a connective tissue to form the neighbourhood.

Neighbourhood Section B-B, Through Shared Vertical Core

A longitudinal section through Neighbourhood A shows the relationship between the private dwellings and the shared vertical core which houses communal spaces such as cooking, relaxing, tending to plants, and more. Below the housing, the section reveals the retail at grade, and the Front Street portal connecting Front Street to the courtyard.

Neighbourhood Section B-B, Through Shared Vertical Core

An enlarged view of the longitudinal section B.

Detailed Section Through Shared Core and Units

Enlarged section showing relationship of the shared vertical core and private dwellings.

Neighbourhood 'Streets': Activity and Experience

promenade/shared street among neighbourhood residents

gardens: herbs and flowers

Neighbourhood "Street" Where Community Gardening and Activity Occurs

Scale: Building, Shared

BUILDING, SHARED SCALE

The public and private spaces of the neighbourhoods are connected at through the ground floor of the building. These shared spaces are important for social and physical interactions, and inform how neighbourhoods can be brought together.

This scale examines the following, and highlights the shared and active spaces through:

- **ground floor design**
- **second floor design**
- **neighbourhood vs building whole: shared spaces**

Ground Floor Plan With Context

FRONT STREET EAST

LOWER SHERBOURNE STREET

PRINCESS STREET

THE ESPLANADE

david crombie park

HAHN PLACE

SCADDING AVE

Enlarged Ground Floor Plan

Enlarged Second Floor Plan

Neighbourhood vs Building Whole - Shared Spaces

Each of the two buildings has 3 neighbourhoods. The centre neighbourhoods of the two buildings (B and E) are the 'anchor' of each building: acting as the main entrances, central active and community zone. The other neighbourhoods connect to this anchor below grade, as seen on page 143. The 'connector' between the neighbourhoods leads to large storage locker units. Storage is in the basement to allow the ground floor to be solely for shared amenities.

Sectional View: Transition Between Neighbourhoods

Scale: Site, Public

SITE, PUBLIC SCALE

Our home can extend beyond our private dwelling, and this scale examines how the site and integration with the city can create opportunities for active lifestyles and extensions of our homes. This scale focuses on connecting with the surrounding city through 'portals', additional cross walks and a public courtyard. By creating an engaging courtyard with variety of opportunities for walking, biking, running, sitting and social gathering active opportunities are present and inviting to not only residents of the housing, but members of the city, brining back public use to an urban site.

This scale examines the following:

- **building form and massing**
- **site design**
 - urban context: site plan
 - pedestrian access & human scale: elevations
 - connecting to the public realm: courtyard relationships
- **street-city-courtyard connection**
 - portals
 - urban perspective
- **courtyard experience and design**

north-west axonometric:

SITE DESIGN

Site Plan

The site plan shows the courtyard housing which frames an active park space which allows variety of activities and changes in elevations and visual connections: connecting the city and the residents.

STREET-CITY-COURTYARD CONNECTION

○ 'Portal'

- - - Straight Path Access (street to courtyard)

■ Added Crosswalk

Portals allow physical and visual access from street level to the courtyard

Allows for greater use of courtyard due to :

- multiple points of entry/exit allowing choice of how to get in/out
- visual connection to nature, art walls, and being guided by lighting and paths
- visibility between city and housing development is clearly understood, inviting pedestrians

Portals

Front Street 'Portal'

Portals

The Esplanade/Park 'Portal'

Portals

Entrance of Courtyard (Princess Street) From Nicholson Lane

The main entrance to the courtyard along Princess street has a straight visual and physical connection through the site and connects to Nicholson Lane.

Urban Perspective

Entry to Courtyard (Sherbourne Street), looking through to connection to Nicholson Lane

View of Housing From Neighbouring Buildings

Ribbon-City Access: Of/Off Points

West Elevation (Along Lower Sherbourne Street)

Stairs on/off ribbon

Section Through Courtyard

pathway follows site slope but dips up to provide access to entry level of dwelling blocks

to dwellings

to dwellings

Courtyard Experience and Design

South End of Courtyard, Looking North

Courtyard From Second Level of Private Dwelling

Courtyard Experience and Design

North End of Courtyard, Looking South

South Entry from Princess Street

09 REFLECTION

The design project tackles many of the complexities within the discourse of housing. Upon reflection, the discussion can be continued to further key ideas. A few topics will be discussed such as: how this project views universal accessibility, the importance of providing choice throughout the design, and expanding opportunities through shared spaces.

UNIVERSAL ACCESSIBILITY

Universal accessibility, in architecture means designing spaces that meet the needs of all people (Craven, 2019). Understanding how complex housing is, truly meeting the needs of all people is near impossible. There are so many inhabitants with different lifestyles, backgrounds and abilities -- it is difficult to accommodate them all in one housing development. Universal design at its core is about the “philosophy behind accessibility” (Craven, 2019), which I believe cannot be strictly defined as meeting the needs of *all* people. The way architects approach universal accessibility through design, is designing for the impaired, and this thesis views accessibility as designing to prevent or reduce impairment. Universal design typically refers to design which allows “you to move freely through [...] rooms and independently perform the basic tasks of life” (Craven, 2019), and The Centre for Universal Design, North Carolina State University defines 7 overarching principles of universal design (1997):

- equitable use ✓
- flexible in use ✓
- simple and intuitive use ✓
- perceptible information (eg, colour, contrast) ✓
- tolerance of error (design minimizes hazards) ✗
- low physical effort ✗
- size and space for approach and use ✓

As it can be seen, the thesis addresses 5 of the 7 universal design guidelines. The two guidelines this thesis does not follow are minimizing potential hazards (providing challenge such as rock climbing walls, ladders, etc), and providing low physical effort. Although these points are valid, they are geared towards people with impairment, and further limit how able bodied people can move in, and use space. This thesis recognizes that there will always be people who can never be fully able bodied due to genetics or medical conditions. But this is why it is important to think about universal design not just for the impaired but the able bodied since limiting physical effort

and sense of challenge can limit how space can be used and accessed, and impact our well-being. New opportunities for design emerge when we challenge our conventions of accessibility and building codes. This may not be practical in all new housing, but why shouldn't we provide opportunity? Challenging our conventions and regulations can spark design innovations or code revisions which allow our housing to give our bodies and minds more agency. The thesis does not disregard physical impairment, as it still provides options for accessibility such as ramps from the housing to the courtyard, elevators to all dwellings and grade, and accessibility at grade through walk-up apartments. The thesis suggests re-thinking what it means to design for accessibility and well-being.

PROVIDING OPTIONS

Providing options is critical for allowing user autonomy, as well as varied movements and interactions. Through the development of the thesis through the five scales, options for degrees of privacy, social interaction, level of activity, and accessibility, allow the design project to accommodate a wide range of users -- furthering the idea that there is no standard family type or urban dweller -- each with unique behaviours and preferences. We all live unique lives and should be afforded choice for how we inhabit, interact and share. This choice further encourages active lifestyles, since there is variability in how people prefer to be active. This thesis uncovers we can no longer provide one standard spatial arrangement, thus the importance of variation and flexibility within lived space.

SHARED SPACE

Shared living can help aid active living, and inform our social and mental well-being. To further the ideas presented in this thesis, the idea of shared space can be pushed further. Social connectedness and activity should also be considered through mixed use spaces such as retail spaces which could become lobby spaces -- connecting active ideas with social integration. In short, thinking of shared spaces should be more malleable, and open to flexibility; where spaces are less prescriptive and more open to suggestion, such as maker spaces. By connecting social and mixed use spaces, harsh thresholds between the city and the home begin to break down; better connecting people and affording opportunities for physically active and socially engaged lifestyles.

CONCLUSION

10

CONCLUSION

This thesis investigates various scales within urban mid-rise housing which identifies and analyzes opportunities for improved well-being through active lifestyles. The thesis focuses specifically on urban housing in the Toronto context, to develop new knowledge on the design of mid-rise housing. The thesis evolved from observations and critiques of Toronto's apartment housing, and that our current mid-rise typology could be better developed to physically and socially engage people. Specifically, the lack of spatial opportunity within our apartment housing which limits our actions, and often poorly attempts to connect residents with city life, was a departure of critique and investigation for this thesis. The initial inspiration and desire to investigate the question of well-being and active living in urban housing raised questions about typology, scale, shared living, amenity, and active design.

Research within architecture, active living, human well-being and affordance theory indicate that there are a range of strategies which can be incorporated into new housing developments to promote well-being by creating more activity and spatial variety. Through the use of affordances, and careful attention to proximities as well as public and private gradients, this thesis tests and develops housing as an instrument for well-being.

This thesis concludes that the mid-rise typology provides great opportunity for this thesis topic on active living, since it better relates to the human scale, better connects residents to their surroundings, and can create stronger visual, physical, and social relationships. By balancing design variables for movement and spatial variation, the thesis found that new forms and relationships can create new behaviours, consequently creating a new way of living. Variables examined for physical and social interactions include:

- Flexible interior environments to hybridize spatial experience, use, and bodily movement
- Gradients of shared spaces within proximity to the private dwelling such that different levels of interaction and activity occur at thresholds
- Functions of the private dwelling are shared among close-knit groups of residents, such as communal cooking and eating areas, as well as play and leisure zones
- Stair use is emphasized while tying social spaces with circulation

- Choice of circulation routes and difficulty are provided
- Visual and physical access to neighbours, city and outdoor amenities such as parks
- Good sensory qualities in the dwelling such as high quality and access to light, air, views and biophilia

As the breadth of housing issues are evidently large, this thesis presents my position and specific knowledge on a focused area of study, presenting new knowledge for how apartment housing can help improve our minds and bodies and overall quality of life as we age. As a person who has lived in very small apartments in Toronto, I have personally felt and experienced many of these issues which speak to lack of variety, movement, community, social interactions, light, views, and other considerations. And as an athlete for all of my childhood, healthy living and exercise has always been an important part of my life and continues to be to this day. Through conducting research for this thesis it is evident of the negative health implications to our bodies and minds when we live in spatially, socially and physically limiting environments. As a future architect, I believe if I can bring new insights and strategies to improve the well-being to the every day lives of people, I will feel utmost fulfillment. This thesis was an exploration of many key ideas that are personally important to me and add to the discourse on housing and active living. The research and explorations have enabled me to build my own foundation of beliefs and knowledge as I begin my professional career in Architecture.

APPENDIX

DESIGN RESEARCH

Through analyzing the current habits both architectural and human within dwelling, and exploring architectural theory such as affordance based architecture, and architecture of disjunction, a few design research exercises emerged to explore the relationship between an active architecture that challenges current spatial and physical notions of home, while bringing more autonomy to the body to move in a variety of ways otherwise atypical from conventional housing.

The first exploration focused on disrupting space and allowing the body to engage with the environment in more physically active ways. Most of our architecture is prescriptive to how our bodies use spaces and the possibilities of actions or activities that can take place in them. It forces a sense of similarity and sameness which allows the mind and body to rely on muscle memory and stored memories to initiate action. It leaves our brains and bodies to become less challenged, as it has been proven that with limited stimulation and variability of spaces or experiences, our bodies decline mentally and physically.

The second exploration focused on obedient/disobedient urban housing in Toronto. The city is building architecture with little ambition, and gives little autonomy to the body to indulge in the material environment or the environment to engage with them to become more active. Breaking the conventions of urban condo housing in the city is explored through concept of body and space activating change or enticing people to interact.

The third exploration focused on how body and space interact to create variety of actions or experiences. The focus on condos are typically one level. This concept looks at spaces of the home as interweaving elements where a dwelling unit creates distance and variation at each level, engaging the body in the three main physical movements: manipulative, non-locomotor and locomotor.

The fourth and fifth explorations focus on the scale of the dwelling unit. The first dwelling study focuses on the architectural concept of the fold described by Greg Lynn in his essay "*the folded, the pliant and the supple* ", sharing qualities between various spaces and creating hybrids where space is not entirely prescriptive.

The sixth exploration focused on the scale of the building, in fragments showing a gradient of private to communal, and varying degrees of activity and play interweaving with living spaces.

DESIGN RESEARCH: HABIT(AT)

BREAKING HABIT AND CHALLENGING OUR BODIES

a)

b)

c)

photography by author

d)

e)

f)

g)

h)

a) Users physically push and pull pins to form seating conditions, working conditions, or art display. This challenges our fine motor skills (grasping, pushing)

b) Physically challenging surfaces, poles for stability. Challenging our non-locomotor skills (balancing)

c) Unusual surfaces for seating can be comfortable for a short duration, ultimately leading to movement when it becomes uncomfortable. This challenges non-locomotor skills of sitting and standing

d) Physical obstacles in our way change typical movement patterns as we move throughout space, creating more challenging and fun environments

e) Do we always need to take stairs? Can we climb and slide? This challenges our locomotor skills, and suggests different ways to transition

f) Environment not static. People should be able to manipulate their environment rather than it being static and 'awaiting them' The user becomes the manipulator of space

g) Sometimes we need to be aware of our actions and reflect upon our habits. Mirrored surfaces bring a sense of awareness and nudge people to become more active and social, or at least make them aware of their habits.

h) Angled surfaces can provide change in comfort but in a temporal sense. TV screens with tilted lounge chairs in front create a sense of temporary stay, as laying and watching TV all day would be too uncomfortable. It is a means to interrupt and nudge.

DESIGN RESEARCH: DIS(OBEDIENT)

OBEDIENT CONVENTIONAL CONDO

Figure 70

Figure 71

OBEDIENT:

As an initial site investigation, the site of Lower Sherbourne Street and Front Street East was analyzed. 33 Sherbourne has a proposed condo tower on the corner of Sherbourne and Front Street East follows the existing social, political and economic structures in place. It is grounded by an economic base (the podium) which is set out to the maximum footprint on the site. Followed by an extruded form that reflects the illusion of 'stability' and sameness, and social 'equality' which is expressed through its monotonous, repetitive form. The tower attempts to break this monolithic extrusion by inserting an intermediate public 'amenity' function, which is an attempt to display that activity does exist within the building. The floor-to-ceiling exterior glazing will call for blinds to be drawn: a symbol of how we provide the perception of connection to our city, but in its failure to do so, it becomes a mechanism for shutting the outside world out. What has our architecture of housing come to? It has become an economic instrument, but in doing so have we lost our ability to connect with one another, and socially/physically express ourselves? Our housing has become a translation of economic and political structures of society into buildings, rather than an act of allowing our buildings to act upon society and to influence how we live, interact and connect.

The three main guiding principles of the proposed tower at 33 Sherbourne Street are 'public' podium for economic gain, repetitive and rather lifeless extrusion of residential floors, and the attempt to provide a glimpse of life in the building through the intermediate amenity block. This tower is obedient to the current structures set in place..perhaps to cater more to human need we need to act in a disobedient way to make change.

The site of investigation for a thesis project has since been moved. The red on the map indicates 33 Sherbourne, with the condo proposal. The site has shifted to 183 Front Street East, highlighted in white, to allow for 4 orientations of building exposure and the ability to work with site and the public realm since it is a much more expansive site. The critique of the proposed tower on 33 Sherbourne, is in essence a critique of the condo towers going up in the city in general, and this obedience present in the city is something to be aware of.

DISOBEDIENT 1

- Communal Resident Space
- Shared With Public
- Residential Clusters

VS

Typical

Mixing

Continuous Ramps
for Public Access:

VS

Disruption of
Economically
Efficient/Repetitive
Plan

Entice and Lure

The change in building form creates less certainty and provides public engagement. It creates a mix between public and private and makes residences and public spaces more ambiguous and fluid.

SEDENTARY
ISOLATED

Bland and ugly when little activity,
interesting and colourful when active.

SENSORY
(ie smell)

Smells trigger memory. Smells display
with colour through the building

ACTIVITY

Bursts display when activity occurs

Constant Change

Breaking the normative of building as an object hiding internal functions or occupant activity, acting as a static object. When people are sitting or isolated for too long on devices, the building's sensors respond by a public display. The floor plates change each level and create variation. Units are pushed to the centre, and shared is pushed to the exterior. Building is responsive to smells and activity.

drawings by author

DESIGN RESEARCH: UN(CONVENTIONAL) HOME

INTERWEAVING HOMES

Typical Condo: Sameness, Repetition, Stacked

Interweaving Homes:

- visual/physical interaction of various spaces
- promotes community
- variation
- longer journey/physical challenge

Spaces and Movement

Urban condos are typically one level. This concept looks at spaces of the home as interweaving spaces where a dwelling unit creates distance and variation from level to level. It transforms the conventional home and its conditions of vertical stacking with horizontal stacking too, and provides opportunity for action and connection, while enabling the three main physical movements (manipulative, non-locomotor, locomotor).

CHALLENGE CONVENTIONS OF TRANSITION

Elongate Path

Hallways: Challenge sensory, Dual function (walk/sit/stand)
(L, NL)

Elongate path of daily routines and make people move. Providing a change in experience as one transitions through space will make people move and sensorimotor capabilities to be strengthened.

MOVEMENT ACTIVATION

Exit/Transition sensory unpleasant until activity in adjoining space

Activity for Daily Needs: Opens Frigde

Creating space to be more dynamic and engaging the body. Activity activated spaces or objects require human input to either transition, do work, or other. Can be used to create pleasant sensory environments, or to allow required activity for necessities such as food, but in a way that gets the body moving.

DESIGN RESEARCH: DWELLING STUDY 1

Getting people to move their bodies in different ways while allowing living spaces to be less prescriptive, allows people more autonomy to shape their habitual spaces to suit their lifestyles and their unique bodies. By allowing the body to move based on how the user wants it to move, what is conceived as the 'normative body' which architecture forces upon us is broken down. As a general society, we are less active, and by not challenging our physical abilities and movements our brains and bodies slip into the 'automatic'. This can be dangerous and leads to decline in well-being -- even shortened lifespan. To engage the body for well-being while user customization of space allows better quality living spaces, and better quality of human life.

drawings by author

Highlighting physical movements as people transition through daily activities. The unit shares an intermediate space with its neighbour across the hall. There is a gradient of private, semi-private, and shared through the building.

MOVEMENTS

Level 3 | sleep/lounge/dine/entertain

Level 2 | work/eat/wash/lounge

Level 1 | bathe/eat/lounge

ZONES & HYBRIDS

Level 3 | sleep/lounge/dine/entertain

Level 2 | work/eat/wash/lounge

Level 1 | bathe/eat/lounge

LEGEND

basic needs

transitions

leisure

activity

fixed

unassigned/
ambiguous

The plan and section form hybrids of use, behaviour or senses. The plan is based around hybrids of experiences rather than solely shaped by program.

LEGEND

Light and air are shared throughout the different levels of the unit, and opportunities for heat and steam can be controlled to share qualities from one space to another. These hybrids form variation of experience and potential for various actions, programs or behaviours to take place in space.

drawings by author

CONCEPTUALIZATION

SINGLE FRAGMENT

PRIVATE AND PUBLIC GRADIENTS

STACKED

This study focused on the unit with a focus on creating good designed space that encourages people to engage with the environment around them and with the city. Light, views and air are important in making this connection and getting people to move. By examining a system of interlocking units, a module of three levels was created to allow each module to have 3 orientations to daylight. A connector challenge path -- which could be a slide, a bumpy surface, or a bouncy one, connects the first level of the unit to the second. The body continues to make movements that strengthen the mind-body connection challenging our sensorimotor, locomotor and cognitive abilities -- through twisting, lifting, balancing, grasping, and climbing.

INTERLOCKING UNITS: VARIETY AND DAYLIGHTING

Initial Exploration

Base Module

light wells: each unit multiple orientations to daylight

drawings by author

Base Form

stacked modules

skip stop residential, and communal spaces
between modules

building fragment

The form depicted here is a digram, and a base massing subject to manipulation. Gradients of public to private can be found as one transitions from the private dwelling, to the communal centre. By separating communal and private space, it creates a distanced path and opportunity for challenging the body, and subjecting it to act in different ways that break the typical habits of our daily routines.

drawings by author

SECTIONAL INVESTIGATION: ONE DWELLING

Light shelves bring light deeper in the unit allowing a more even distribution of daylight. Extend-able, pop-out balconies and extensions of the facade allow a look out onto the city: an opportunity for meditation, a space to read, a space to grow plants, etc. Each level incorporates the body to act on it to shape space, or transition from one level to the next.

The connector between the first and second level of the unit is exposed from the exterior and the body transitioning can be seen from the exterior of the building. Different design palettes can allow for different types of transitions, such as one focused on balancing, climbing, sliding, etc.

drawings by author

PLANS

LEVEL 3

LEVEL 2

LEVEL 1

Space is customizable to the user. Space for sleeping, working, planting and hobbies can be accommodated on one floor -- each floor is not solely dedicated to one use, rather the user can alter the way which they intend to use it, in a way which it is not static and can change as their desires or needs change.

PLANS: LEVEL 2

This level is the primary space for sleeping, however it can be transformed into a place to work, entertain or dine.

The first level provides a flexible dining and kitchen area which can be closed off for a space to dine, entertain or lounge. The shower converts into sitting as a panel can be lifted over the seat of the shower and become a lounge space. The steam and heat from the shower heats up the space, and can transfer through the transitional spine between levels 1 and 2. Tables are on a track in the ceiling which by hand crank, can raise and lower, and the track it can move left and right allowing the table to be tucked away out of sight when not in use.

UNIT FLEXIBILITY: LIFESTYLES & ECONOMIES

Units can be compartmentalized and used for other uses or as rentable space. The module can be divided into two units: unit 1a/b, on levels 1-2, and unit 2 on level 3. People live different lifestyles and encounter changes at different stages of their life -- what if their home could respond to that?

MEET DAVE

Dave is a busybee who is always on the go for work. Cooking for him isn't something he enjoys nor has time for and prefers to order uber eats or use a communal kitchen.

Since Dave doesn't need much space as he is on the go, he is renting the top floor of his unit and has chosen a minimal kitchenette to make room for other uses.

MEET SUE

Sue loves to entertain, so having all three levels of her unit is essential to accommodate all her friends who visit often.

Sue has chosen a unit which caters to flexible entertaining spaces, and has opted for flexible sleeping and working configurations through sliding elements.

MEET CHRIS

Chris loves to grow plants and has turned his upper level of his apartment into a space to grow plants and record their processes for his photography hobby.

Part of the rope ladders in his apartment are used to vine plants.

MEET ALLY

Ally loves cats. She chose a palette which is called 'the jungle gym'. which provides challenging elements such as ropes, ladders, slides and movable elements. She and her cats can climb around.

FORMULATING A DESIGN PALETTE CUSTOMIZATION TO USER LIFESTYLES (proposal)

Figure 36: Menu

Figure 37: Advertisement

EXAMPLE (schematic)

drawings by author

Similar to a menu, predetermined design palettes allow for different users to choose a palette that best suits their lifestyle. With the rise of people ordering Uber Eats and not cooking, the design palette would incorporate different design considerations that are more specific to that life style. For example, people who do not cook would prefer service slots from their exterior wall right into their unit for deliveries, or an opening that allows deliveries to go straight into the fridge. The palette would aim to address various lifestyles.

DESIGN RESEARCH: FRAGMENT: PRIVATE TO COMMUNAL

DWELLING AND COMMUNAL FRAGMENTS

Key Section: Callouts for Dwelling and Communal Fragments

Interweaving of activity and play with communal and public program spaces

FORM INVESTIGATION

voids and in-between spaces

no shell: volumes create form

extrude beyond shell

extrusion within shell

extrusion

DWELLING FRAGMENT

An initial investigation of the relationship between the private dwelling unit and the semi-public space that connects the communal centre to the private residence.

COMMUNAL FRAGMENT

An initial investigation of the relationship of massing, program, voids and light in the communal centre. Further investigation of manipulation of the form and creating moments of transition which people act and move in different ways is still required.

MOVEMENTS SUMMARY

MANIPULATIVE

Fine motor skills and coordination, controlled use of the hands and feet | Grasp, throw, catch, footwork

NON-LOCOMOTOR

Balance and coordination: relation of body to place or object | balance, push, pull, twist, sit and rise

LOCOMOTOR

Gross motor skills: any movement of body from place to place | crawl, walk, step, skip, jump, climb

REFLECTION: EXPECTATIONS VS OUTCOMES

EXPECTATIONS: Reflecting upon the design research conducted between Milestone 1 and Milestone 2, I expected to start to see possibilities where movement of bodies can be incorporated into the design of space, or where designed space can influence our bodies into more actions. Through the investigations, I expected to extract moments where design elements could be incorporated into a thesis project. I also expected that through my investigations, it would uncover ways which people can live that incorporate higher levels of activity, while also allowing for flexibility that creates variation and customization of lived space(s). I expected that the drawings would be a medium to test out ideas and see where things work, or do not work in terms of functionality and allowing greater degrees of movement or activity. Exploring the dwelling unit in two themes 1) blending spatial configurations to create bodily movement and shared spatial/sensory qualities, and 2) using natural and designed elements to create environmental conditions which encourages people to engage with their surroundings more; focusing on daylight, views and biophilia, helped to raise questions regarding the importance of the unit being so dynamic in its flexibility and opportunities for movement, and brought forward the more powerful impact which shared spaces can have on getting people to move and be more active in their living environments.

RESULTS: What resulted from these investigations did lead to indications of how movement can be incorporated into design, however more work on how this relates to an aggregate building still needs to be explored. I will explain the results of the following six explorations, to highlight what the findings were of the investigations:

Exploration 1 – Habit(at): The first exploration looked at how disrupting space through surfaces and objects can engage the body more physically with its environment. This study was an introduction to affordances and how to initiate kinesthetic aspects of in space, however it turned out to be more about moments with objects rather than informing the spatial qualities of a space. The study resulted in moments which do initiate action, however, were not as informative to moments which speak spatially to a design. I think what could have furthered this exploration is how tactility and objects can be incorporated into space(s) to have a greater effect of how people transition through or occupy space(s) – how these elements can create spatial environments which impact how people move or behave in space.

Exploration 2 -- Dis(obedient): The second exploration looked at what is considered 'obedient' in Toronto's urban housing. It examined the static nature and lack of variety within our current housing designs, and that this obedience is creating repeated actions and habits which do not challenge our bodies or minds. This study resulted in examination of how buildings could express activity such as smell, physical activity, celebration and gathering. However, projecting interior activity on a digital façade took away from the architecture reflecting the activity, instead using architecture as a display screen. This study was a good start to thinking differently and understanding why our housing is so obedient – thinking of ways of breaking this obedience, however only expressing activity through digital projections is weak as it downplays the potential architecture has in reflecting such activity, and its ability to be kinetic and create a relationship between what is happening on the inside, and how it is reflected on the outside.

Exploration 3 – Un(conventional) Home: The third exploration looked at body as a mechanism for activating things. Why not use our bodies to activate spaces or objects? Should everything be so simple and repeated? What came out of this exercise was that our conditioned ways of moving in housing is limited, mainly focused on walking and sitting. By creating different floor levels and different transitions between spaces, it allows for a new way to experience what we consider our conditioned daily routines. This exploration was more of a diagram to work out ideas of transition and multi-leveled spaces. It could have gone further to explore what the experience would be with aggregated units in urban housing.

Exploration 4 and 5 – Dwelling Studies: The fourth and fifth explorations looked at the dwelling unit as described earlier, in two themes: 1) blending spatial configurations to create bodily movement and shared spatial/sensory qualities, and 2) using natural and designed elements to create environmental conditions which encourages people to engage with their surroundings more; focusing on daylight, views and biophilia.

Theme 1: This study examined spaces with multiple functions, requiring bodily movement or action to transform space for different uses. At the beginning of this exercise, I expected that a unit with a more curved form would make the body move in different ways to get from one place to another, or to use space in different ways. However, it resulted in an extrusion which was somewhat arbitrary. It did however allow for a large range of movements and flexibility of

space which required bodily action to transform the use and physical nature of the space. It also showed that spaces can be less prescribed, and more user manipulated but making it evident that some spaces or elements have to be fixed such as washrooms. Sharing sensory qualities was examined such as the steam of the bathtub heating the lower level of the unit, but the sensory aspect did not move past impact of sun and the steam.

Theme 2: This study took the examination of the dwelling under a new focus: how environment can impact how people feel and improve attitude, well-being and a desire to interact with the city. The focus was on creating good design space with use of multiple orientations to daylight and multiple views, while allowing the interior space to be flexible so that users can actively change their dwelling. Since light, views and air are important in encouraging people to move and engage with their environments, interlocking units were investigated so that each module/dwelling had 3 orientations to daylight. However, the design of stacked rectangles proved effective for daylight, however more limiting in design since there is very little wall-space for storage or placing furniture against, etc.

Exploration 6 – Building Scale – Fragments: The final exploration focused on the scale of the building and how fragments of the building can be examined for different scales of interaction, and gradients of public and private. This part of exploration was underdeveloped for the Milestone 2 presentation, however what I expected to get out of it was new ways to transition between spaces, and organization of the building which created unconventional connections between programs and the dwelling units. The blobs started this dynamic form and extruding beyond the shell of a typical building, but they are in their own organization uniform and have a sense of repetition. This is not what I intend for relationships between spaces in the final design project. The form is very rectangular, stacked and typical, and the centre is where the organization starts to differ. Instead of private and shared space distinctively different, it would be better if the two merge or become more fluid with one another.

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GLOSSARY

Active: The act of physically engaging the body into movements, requiring energy

Active Architecture

Built form which engages the body to move in a variety of ways, while using bodily movement to manipulate spatial configurations.

Active Urban Dwelling

Multi-family housing which encourages active lifestyles through manipulation of bodily movements and built space.

Alternative Actions

Different movements or behaviours that diverge from the our conditioned ways of living.

Architectural Quality

Architectural quality refers to the qualities of designed space, and these qualities are dependent on a set of values. These values are:

- Daylight
- Gradients of public and private
- User autonomy
- Bodily autonomy
- Physical, visual, & social connections

Body

The physical structure of a person.

Co-Housing

Housing typology that incorporates shared living arrangements where individuals share physical program spaces. A focus on social relationships and shared sense of belonging is prominent in this housing typology.

Good Architectural Space

Spatial and sensory qualities are that are incorporated into housing such as:

- Social interaction opportunities
- Emphasis on stair use that are tied to social spaces
- Alternative routes of circulation such as variety and choice of experience and use of space
- Communal spaces for shared uses which focus on visibility, daylighting and connection between interior and exterior thresholds
- Gradients between public city, and private dwelling which enable interstitial active zones

Lack of Variation

A critique of apartment housing and their lack of:

- Human scale & relation to the ground/street level
- Views to nature
- Multiple orientations to daylight
- Close proximities between shared spaces and private living spaces

Livability

Livability refers to the qualities of the environments around us that allow humans to thrive. Qualities of livability that inform architectural design are both the spatial and non-spatial qualities such as incorporation of daylight, natural ventilation, vegetation, social connectivity and community within and around residential space. To achieve livability in design, the human must be put first so that their needs are at the core of the design.

Material Environment

The physical resources or objects which impact the development and actions of our behaviour.

New Conception of Active Housing

How design based around being physically active and benefiting our well-being can inform new ways of designing apartment housing in Toronto. This new conception focuses on:

- Social interaction opportunities
- Emphasis on stair use that are tied to social spaces
- Alternative routes of circulation such as variety and choice of experience and use of space
- Human scale & relation to the ground/street level
- Views to nature
- Multiple orientations to daylight
- Close proximities between shared spaces and private living spaces
- Flexible and varied living environments which engage the body to move in more ways than typical apartment housing

Non-Human

Factors or objects that influence people and our agency, but are not human.

Quality of Life

Possessing health, happiness, and being able bodied to participate in and enjoy life events. Architecture can improve quality of life through its opportunities for engaging with people and space, as well as through its spatial and physical qualities such as access to daylight, air, views, and biophilia.

Space

The built environment.

Spatial Hybrids

Mixing qualities or characteristics of different spaces to create new uses, behaviours or senses. Spatial hybrids are based around multiple factors, rather than being tied to a specific program.

Variations of Body and Space

Different spatial and physical manipulations of body and built space. Variations of body and space allow agency for more movement and varied spatial environments.

Well-Being

State of healthy physical and mental functioning in a person, and feeling general sense of health or happiness or productivity.