

YOUTH BELONGING SIMCITY

SANDBOXING FUTURES in a DIGITAL REGION

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INTRODUCTION

Much like the Sims in SimCity, RUNWITHIT Synthetics' (RWI) never-identified synthetic individuals allow us to conduct surveys, connect the physical and built environments, visualize life patterns, demographics, psychographics and health, and more. RWI's methodology enables the trialing of multivariate what-if scenarios with any combination of services and programs to determine optimal configurations- even by dialling scenarios forward into the future!

Working with the Children and Youth Planning Table (CYPT) of the Waterloo Region, ON, Canada, RWI employed human-behaviour modelling in a geospatially accurate simulation that incorporated public data to measure Sense of Belonging in youth (ages 9 to 18). Belonging is one of the key metrics quantifying community connectedness and social health. Baseline Belonging was compared to "new" Belonging in various "what-if" scenarios, where social programs targeting marginalized youth were introduced or made accessible. Results showed variation in the impacts of these programs by region, household income, race, physical ability, age, gender, sexual orientation, socioeconomic status, etc. Downstream impacts of improved Belonging were measured in increased high-school graduation rates, classroom attendance, extracurricular participation, student employment, new jobs created, investments made, taxes paid, and overall GDP contributions to the regional economy. Further impacts could involve youth retention, workforce, community and economic growth, and more.

RESULTS

FOUNDATION

1 45% of youth report a strong Sense of Belonging in the Region of Waterloo according to the Synthetic Survey, compared to 64% in the real survey conducted by the CYPT in 2021.



2 At a 100% response rate in the Synthetic Survey, we captured under-represented and invisible segments of Waterloo's youth as well.

Boys aged 9-18 and 23% of CYPT survey respondents had been male.

Who needs more representation in the survey? Townships were underrepresented with 58% of CYPT survey respondents from the 3 cities.

Non-binary youth represented 2.5% of CYPT survey responses, while they make up 4.4% of children in Waterloo Region.

Visible minorities such as Asian and Black youth had low rates of response (other minorities were even lower).

3 Location of residence makes a difference. Youth residing in the townships or rural centers feel stronger Belonging compared to those residing in densely populated urban centers, or in the cities.

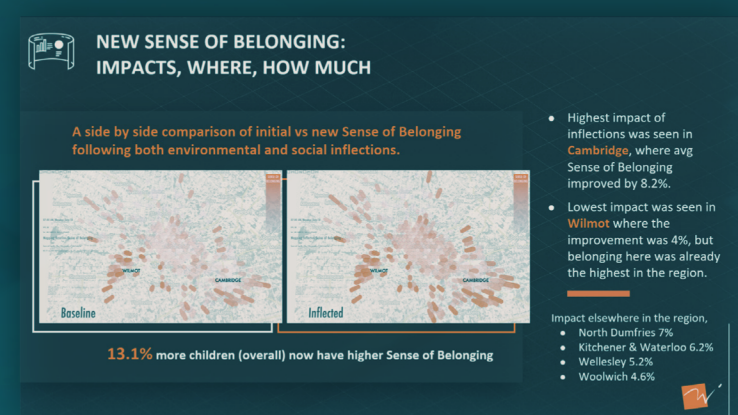
SCENARIO ONE: Access to Supports and Proximity to Parks

4 Unequal access to social supports and services impacts Belonging.

In scenario one, we increased the proximity to parks and access to supports from teachers and families available to youth. This resulted in improved environmental and social scores. Together, these improvements had a positive impact on the overall Sense of Belonging in the region.

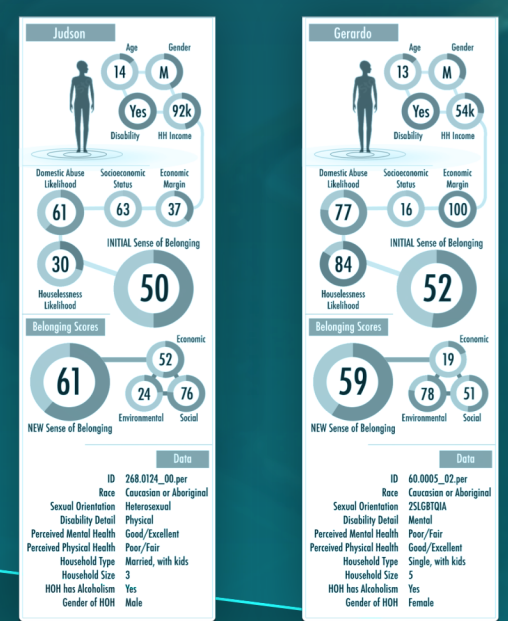


5 The greatest improvement in the Sense of Belonging among youth was observed in densely populated urban centres, where Belonging was generally weaker to begin with.



Access may differ based on socioeconomic status, physical and mental health, social support and network, environmental conditions such as quality of air, nearby parks etc. and location of residence (urban or rural).

6 Youth with intersecting vulnerabilities may be less impacted by individual changes, because they require more complex interventions. For example, Judson, whose circumstances are more secure, benefitted more from the interventions in this scenario than Gerardo did.



CONCLUSIONS

- RWI's Synthetic Populations unlock the capability to run Synthetic Surveys, an effective data-supported decision and engagement tool to trial and optimize policies, investments and services in silico, in place and over time, de-risking critical engagement and decisions.
- Synthetic Surveys enable in-depth innovation of the Sense of Belonging among youth across hyperlocalized Synthetic Populations, measuring the impact of different supports, programs, or opportunities on that Sense of Belonging.
- Synthetic Surveys provide an unbiased and comprehensive method of data collection, allowing invisible, marginalized, intersectional, and underrepresented youth to be heard and included in data sets.
- Sense of Belonging is an important indicator that contributes to fundamental community connectedness, performance in school, participation in after-school programs and activities, social success, employment, graduation rates, and even GDP contributions. Synthetic Modelling allows us to measure the impacts that various interventions may have, not only on Sense of Belonging, but on the impacts of improved Belonging, both at the present time and played forward into the future.

ACKNOWLEDGEMENTS

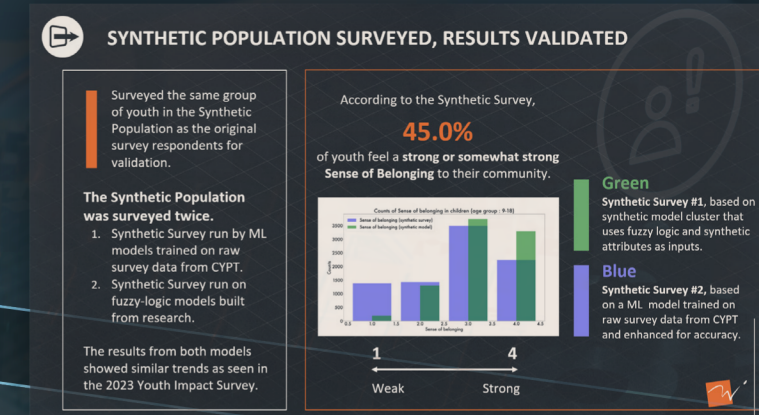
- CHILDREN AND YOUTH PLANNING TABLE OF WATERLOO REGION
- STATISTICS CANADA
- REGION OF WATERLOO AND GRAND RIVER TRANSIT

DEFINITIONS AND METHODS

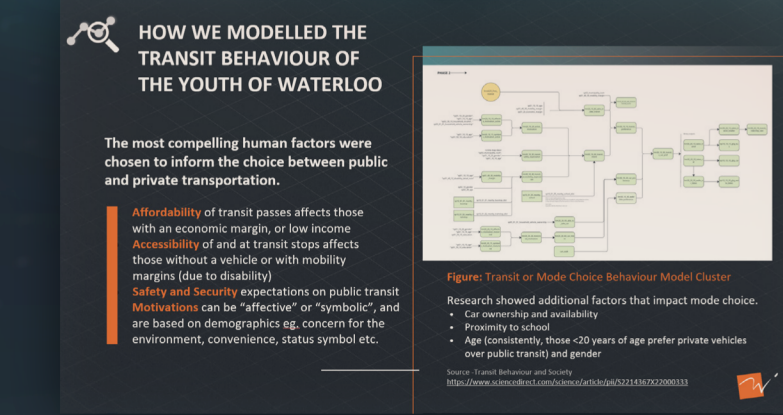
Open data from Census, Open Street Maps and other sources were used to generate the Synthetic Population of the Waterloo Region, whose characteristics are shown here.



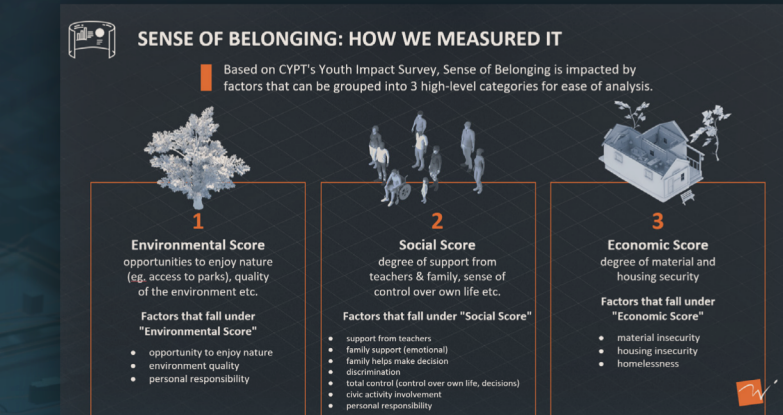
Synthetic Surveys were implemented using machine learning, and by employing fuzzy logic in inference engine models. Raw survey data from the CYPT was used to train the ML models.



Synthetic Modelling was used to model transit use patterns and behaviours of commuters in the age group 9 to 18 via an interconnected web of models.



Sense of Belonging was quantified by breaking it down further into three categories of scores- social, environmental and economic. Each individual had all three scores based on their unique demographics and psychographics.

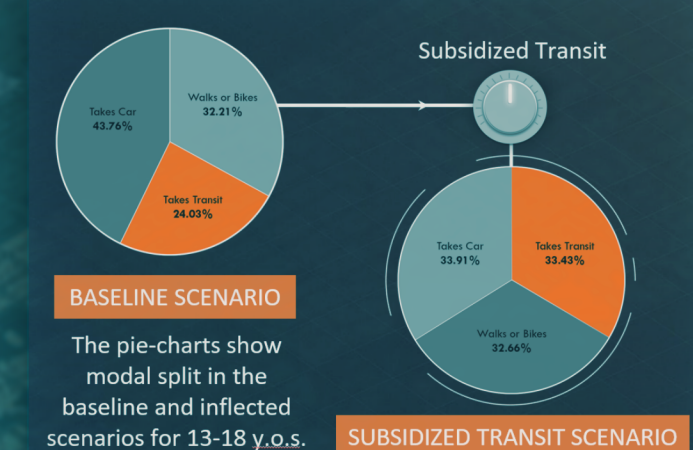


SCENARIO TWO: Subsidized Transit for Youth Ages 13-18

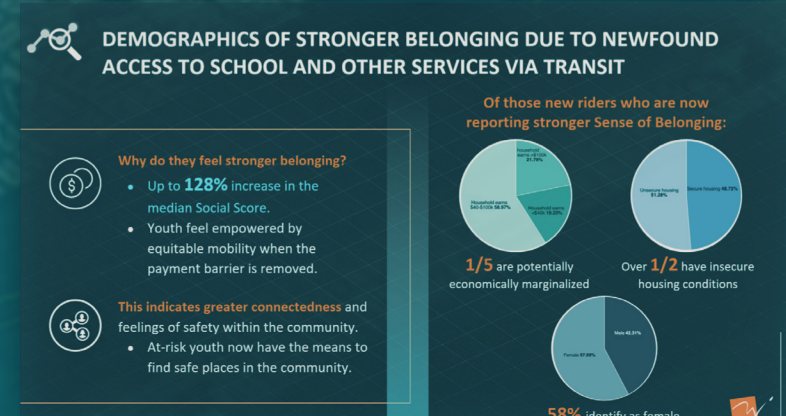
7 One potential policy change that could increase Sense of Belonging for youth is subsidizing public transit.

In scenario two, youth aged 13 to 18 were given unrestricted transport access to school, extracurricular activities, support programs, and employment, to facilitate increases in Environmental, Economic, and Social Belonging.

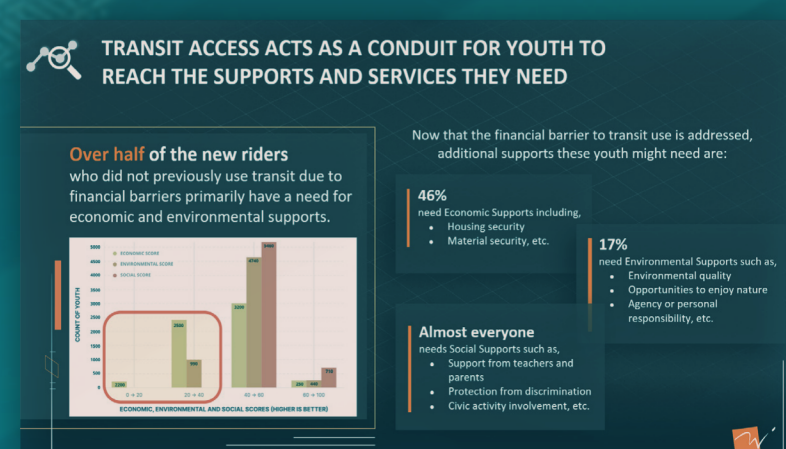
The results showed thousands of new transit riders, over half of whom were previously unable to use public transit due to the payment barrier.



8 7.4% of all new riders moved from reporting a weak Sense of Belonging to a strong Sense of Belonging, now that they can access the supports and services they need via subsidized transit. Of these new riders, over half are female, one in five and economically marginalized, and a majority have insecure housing conditions.



9 Diving into the demographics of new riders and their unique needs led to the following observations.



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