Below is one mathematically driven method that uses only the reported "single" percentages and a set of relative weights. In this approach we assume that some fraction of those reported as single are actually in LAT relationships. We then choose relative factors (which we call g_i) for each age group to reflect the idea that—based on external evidence (Vanier Institute/GSS Survey)—the likelihood that a misclassified single is actually in a LAT relationship varies by age. Finally, we solve for an overall scaling factor that makes the weighted average LAT prevalence equal our target (11%).

1. Define the Reported "Single" Percentages and Age Weights

For each age group i, let

$S_i = Reported\ "single"\ percentage\ (as\ a\ decimal)$

- 18-25: $S_1 = 0.9235$ (i.e. 92.35%)
- 25-35: $S_2 = 0.4230$
- 36-45: $S_3 = 0.1450$
- 46-60: $S_4 = 0.1200$
- 60+: $S_5 = 0.1500$

And let w_i be the population weight for each age group (from StatsCan). For example, one set of weights (for men) is:

- 18-25: $w_1 = 0.2979$
- 25-35: $w_2 = 0.1916$
- 36-45: $w_3 = 0.1557$
- 46-60: $w_4 = 0.2266$
- 60+: $w_5 = 0.1282$

2. Assume a Model for Misclassification

We suppose that in each age group a fraction f_i of the reported singles are actually LAT. In other words, the **Adjusted LAT percentage** in age group i is given by

$$LAT_i = S_i \times f_i$$

Rather than choosing each f_i arbitrarily, we assume that these fractions are proportional to a set of relative misclassification weights g_i. That is, we set:

$$f_i = kg_i,$$

Where:

- g_i reflect the relative likelihood that someone in age group i is in a LAT relationship (based on external evidence) and
- k is an overall scaling factor

For instance, if external evidence suggests that misclassification is higher among young adults and lower among older adults, we might choose (as one example):

- $g_1 = 0.25$ for 18-25,
- $g_2 = 0.25$ for 26-35,
- $g_3 = 0.25$ for 36-45,
- $g_4 = 0.25$ for 46-60,
- $g_5 = 0.25$ for 60+

Then the adjusted LAT percentage in each group becomes

$$LAT_i = S_i \times (kg_i).$$

3. Impose the Overall LAT Prevalence Constraint

We want the overall weighted LAT prevalence across age groups to equal our target of 11% (or 0.11 in decimal). That is, we require

$$\sum_{i=1}^{5} w_i \times (S_i \times kg_i) = 0.11.$$

Plugging in our values:

- For 18-25: $w_1S_1g_1 = 0.2979 \times 0.9235 \times 0.25 \approx 0.06877766$
- For 26-35: $w_2S_2g_2 = 0.1916 \times 0.4230 \times 0.25 \approx 0.02026170$
- For 35-45: $w_3S_3g_3 = 0.1557 \times 0.1450 \times 0.25 \approx 0.00564413$
- For 46-60: $w_4S_4g_4 = 0.2266 \times 0.1200 \times 0.25 \approx 0.00679800$
- For 60+: $w_5S_5g_5 = 0.1282 \times 0.1500 \times 0.25 \approx 0.00480750$

The sum of these products is approximately:

$$\sum_{i=1}^{5} w_iS_ig_i \approx 0.06877766 + 0.02026170 + 0.00564413 + 0.00679800 + 0.00480750 \approx 0.10628899$$

.

Thus the equation becomes

$$k \times 0.10628899 = 0.11$$

Solving for k:

$$k = \frac{0.11}{0.10628899} \approx 1.035$$

For all practical purposes, k is essentially 1. This means our chosen relative weights g_i are already consistent with an overall target of 11%.

4. Derive the LAT Percentages

Now the adjusted LAT percentage in each age group is

$$LAT_i = S_i \times (kg_i) \approx S_i \times g_i.$$

Calculating these:

- 18-25: $0.9235 \times 0.25 \approx 0.2313$ → about 23.13%
- 26-35: $0.4230 \times 0.25 \approx 0.1058$ → about 10.58%
- 36-45: $0.1450 \times 0.25 \approx 0.0363$ → about 3.63%
- 46-60: $0.1200 \times 0.25 \approx 0.0300$ → about 3.00%
- 60+: $0.1500 \times 0.25 \approx 0.0375$ → about 3.75%

Updated Single Percentages:

- 18-25: $0.9235 - 0.2313 \approx 0.6922$ → about 69.22%
- 26-35: $0.4230 - 0.1058 \approx 0.3172$ → about 31.72%
- 36-45: $0.1450 - 0.0363 \approx 0.1087$ → about 10.87%
- 46-60: $0.1200 - 0.0300 \approx 0.0900$ → about 9.00%
- 60+: $0.1500 - 0.0375 \approx 0.1125$ → about 11.25%

Calculation Methodology for Family and Child Metrics (see accompanying excel sheet)

Data Sources

All base counts (population by age and sex, number of families, and breakdown by number of children) were taken directly from Statistics Canada tables (Year X, Table Y). No further adjustments were made to the raw values.

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1. Percentage In-/Out-of-Families

For each five-year age band, we first computed the **total population** as the sum of the female and male counts:

$$TotalPop_{\mathrm{a}} = Females_{\mathrm{a}} + Males_{\mathrm{a}}$$

where $_{\mathrm{a}}$ indexes the age group (e.g. 18–25).

Then, using the “persons living in census families” count from Stats Canada, we calculated:

$$\%\, InFamilies_{\mathrm{a}} = InFamilies_{\mathrm{a}} \,/\, TotalPop_{\mathrm{a}}$$
$$\%\, OutFamilies_{\mathrm{a}} = 1 - \%\, InFamilies_{\mathrm{a}}$$

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2. Percentage & Number With/Without Children

Within each age band, Stats Canada provides “census families total” and “census families with no children.” Let:

- $FamTotal_{\mathrm{a}}$ = total number of families in age group $_{\mathrm{a}}$
- $FamNoChild_{\mathrm{a}}$ = families in $_{\mathrm{a}}$ with zero children

Then:

$$\%\, NoChild_{\mathrm{a}} = FamNoChild_{\mathrm{a}} \,/\, FamTotal_{\mathrm{a}}$$
$$\%\, WithChild_{\mathrm{a}} = 1 - \%\, NoChild_{\mathrm{a}}$$
$$\#\, WithChild_{\mathrm{a}} = FamTotal_{\mathrm{a}} - FamNoChild_{\mathrm{a}}$$

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3. Percentage Breakdown by Number of Children
For families **with** children, we further split by exact child-count buckets (1, 2, 3, 4+). Let:

- $FamWithChild_{\mathrm{a}}$ = # $WithChild_{\mathrm{a}}$ (from step 2)
- $FamNChild_{\mathrm{a}}$, □ = count of families in age band $_{\mathrm{a}}$ with exactly □ children

Then for each □:

% $NChild_{\mathrm{a}}$, □ $=$ $FamNChild_{\mathrm{a}}$, □ / $FamWithChild_{\mathrm{a}}$