PROJECT OVERVIEW & OBJECTIVES

- Predict which employees are likely to leave
- Identify key factors influencing attrition
- Analyze patterns by age group and department

MODEL & METRICS

OBJECTIVE 1: PREDICTING EMPLOYEE ATTRITION

We used a Random Forest Classifier to model attrition.

Key metrics:

- Accuracy: 74.58%
- Balanced Accuracy: 74.5%
- Kappa Score: 0.49 (moderate agreement)
- P-Value: < 2e-16 (highly significant)

Our model serves as a strong baseline for identifying attrition risk.

It shows a good balance between predicting who stays and who leaves, with acceptable misclassification for business use.

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Confusion Matrix and Statistics

                Reference
Prediction     0     1
         0  4752  1538
         1  1492  4137

                Accuracy : 0.7458
                  95% CI : (0.7379, 0.7536)
     No Information Rate : 0.5239
     P-Value [Acc > NIR] : <2e-16

                   Kappa : 0.4902

 Mcnemar's Test P-Value : 0.4136

             Sensitivity : 0.7611
             Specificity : 0.7290
          Pos Pred Value : 0.7555
          Neg Pred Value : 0.7349
              Prevalence : 0.5239
          Detection Rate : 0.3987
    Detection Prevalence : 0.5277
       Balanced Accuracy : 0.7450

        'Positive' Class : 0
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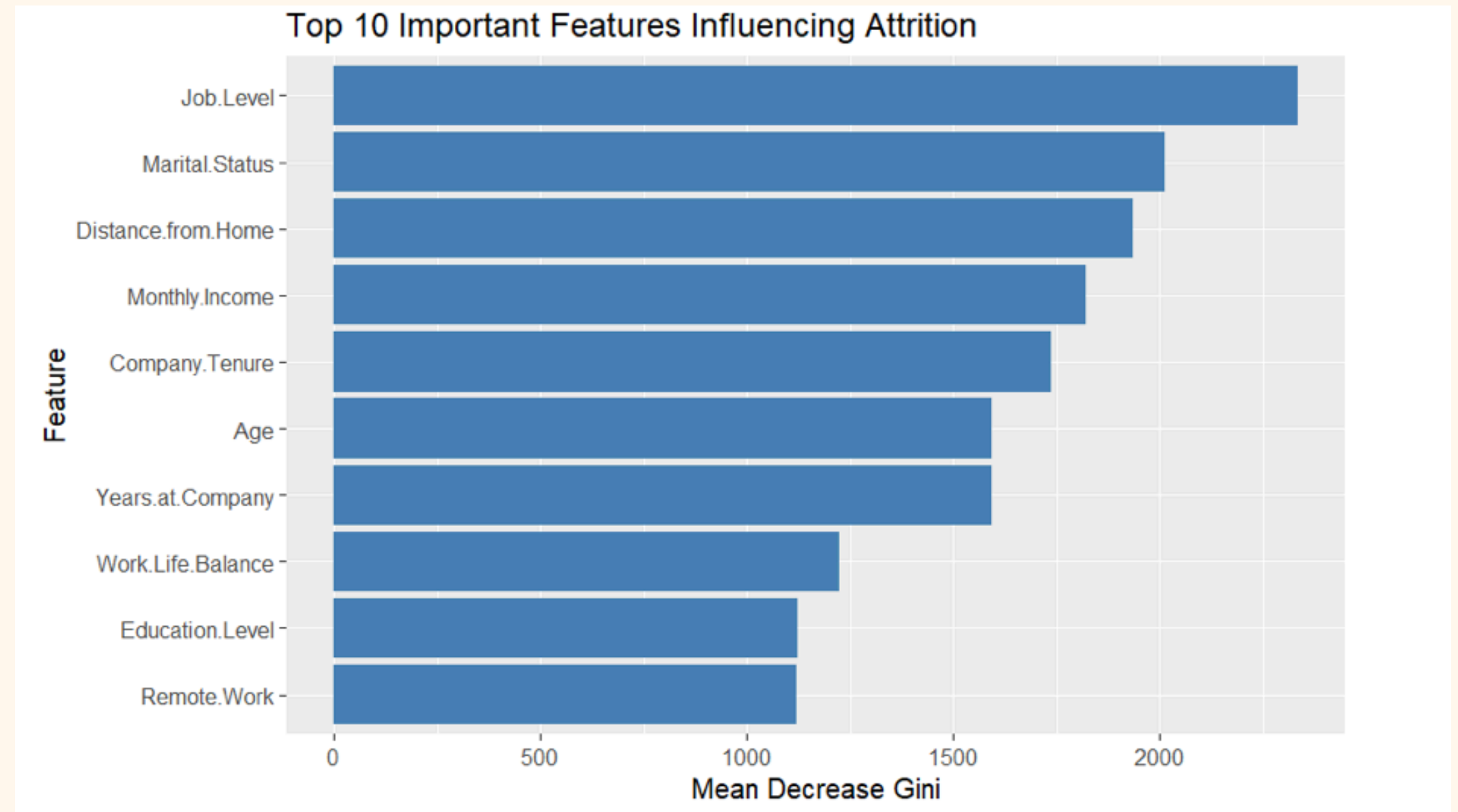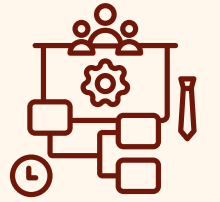
OBJECTIVE 2: WHAT DRIVES ATTRITION?

- Job Level and Marital Status are the most influential factors.
- Financial and lifestyle indicators (income, distance, tenure) significantly impact retention.
- Surprisingly, Remote Work and Education were less predictive than expected.

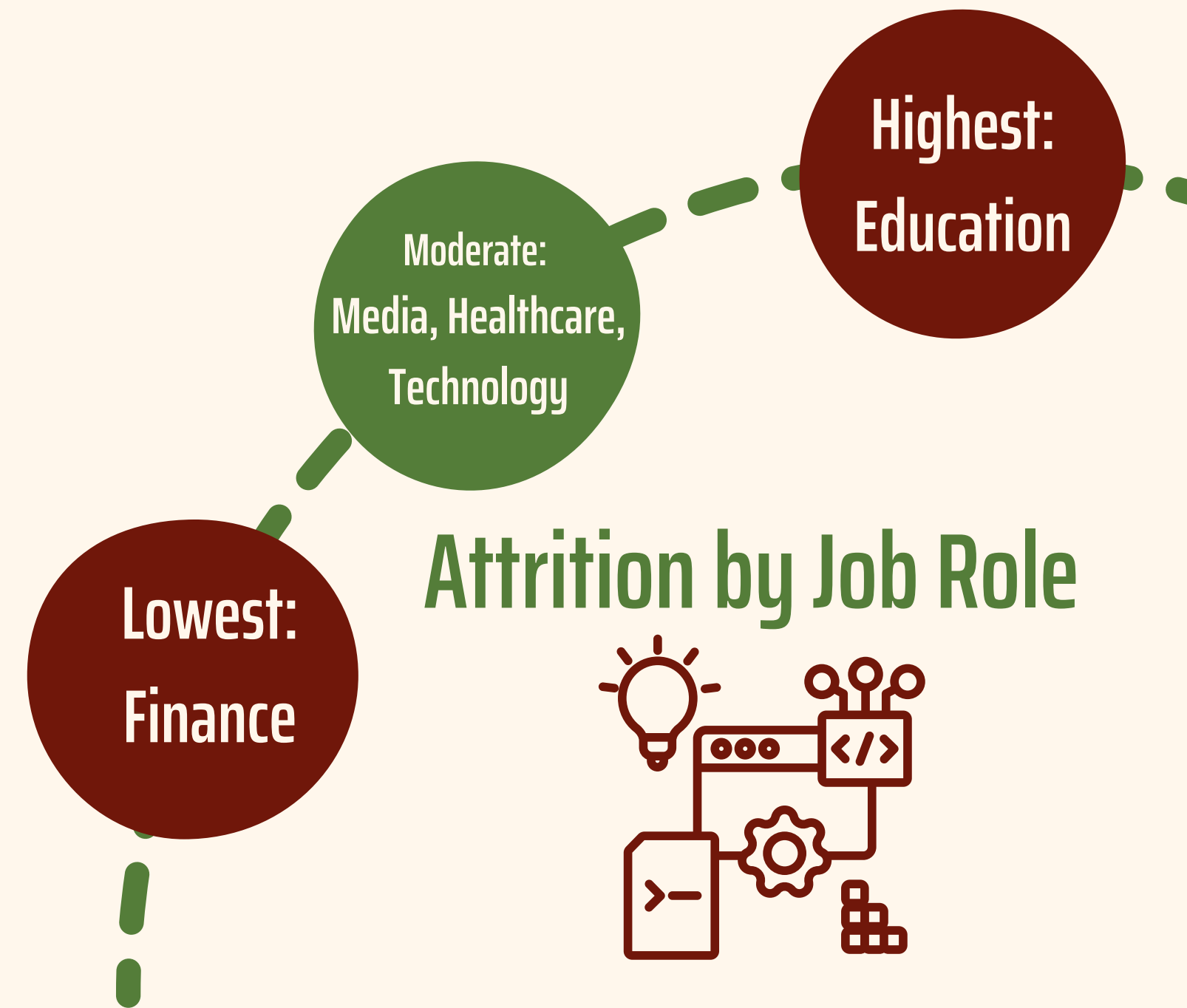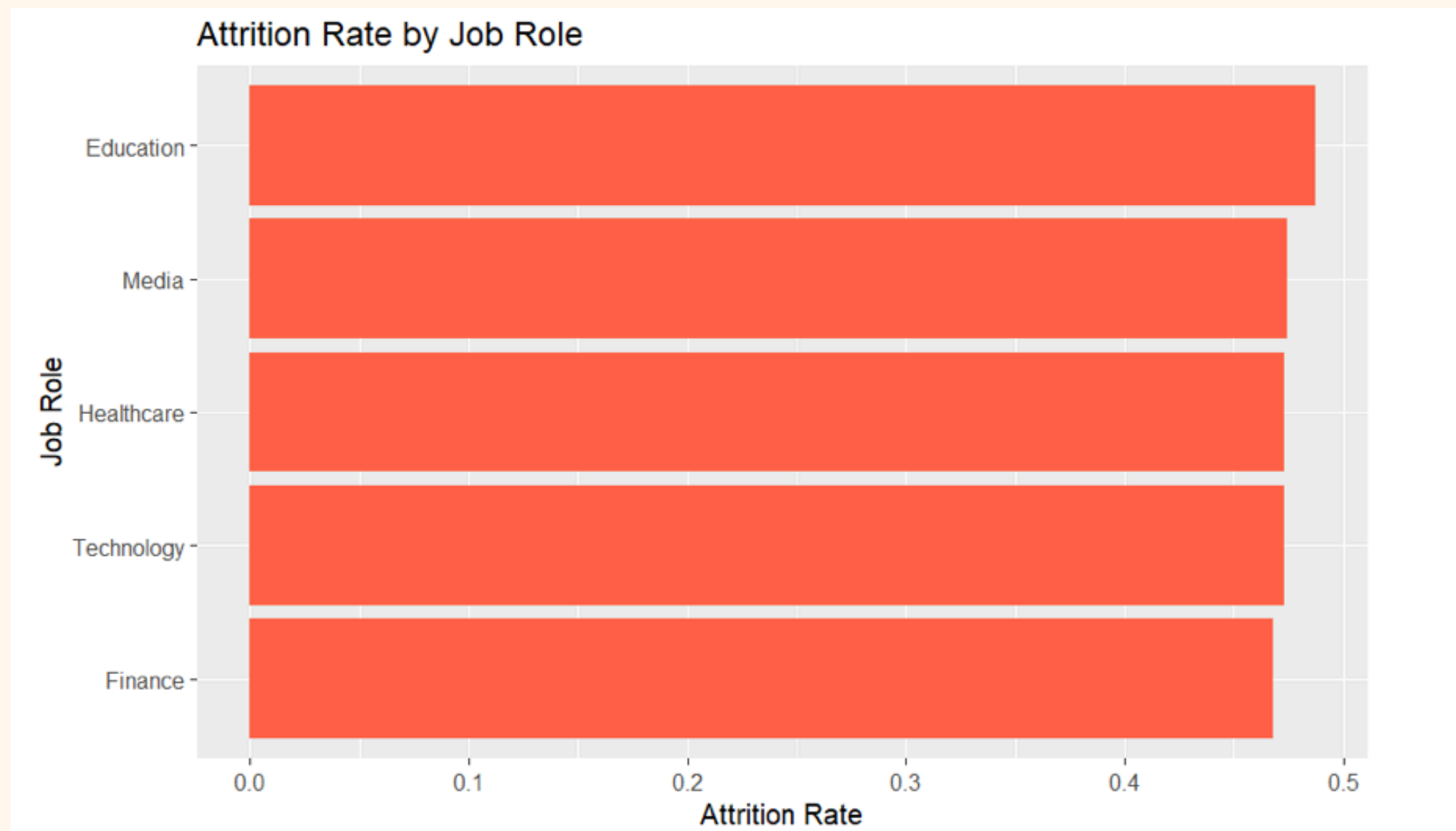Top 10 Important Features Influencing Attrition

OBJECTIVE 3: DEPARTMENT-LEVEL ATTRITION

High attrition in education may reflect burnout and low flexibility, while Finance benefits from stability and structure.

- Most likely to leave: 20–29 years
- Most stable: 50–59 years
- Mid-career groups (30–49) show moderate turnover

Younger employees often leave for growth; older ones value stability.

Attrition Rate by Job Role

Highest: Education

Moderate: Media, Healthcare, Technology

Lowest: Finance

Attrition by Job Role

AGE-BASED RECOMMENDATIONS

- 20–29 (High Attrition):
  - Mentorship & onboarding
  - Fast-track & rotational growth programs
  - Pulse surveys for early feedback
  - Clear career path visibility
- 30–49 (Moderate Attrition):
  - Leadership development programs
  - Cross-functional movement
  - Recognition and upskilling
  - Incentives for progression
- 50–59 (Low Attrition):
  - Phased retirement options
  - Tenure-based rewards
  - Mentorship roles

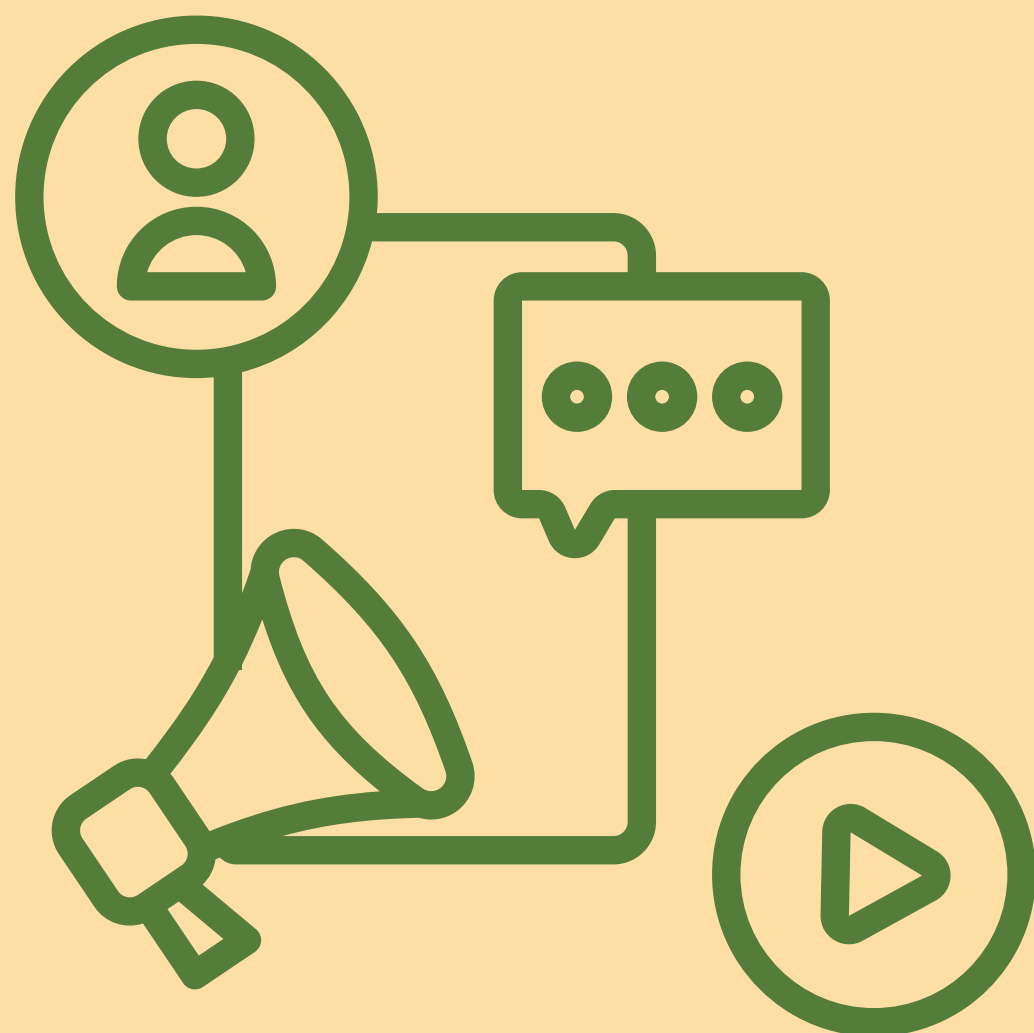Attrition Rate by Age Group
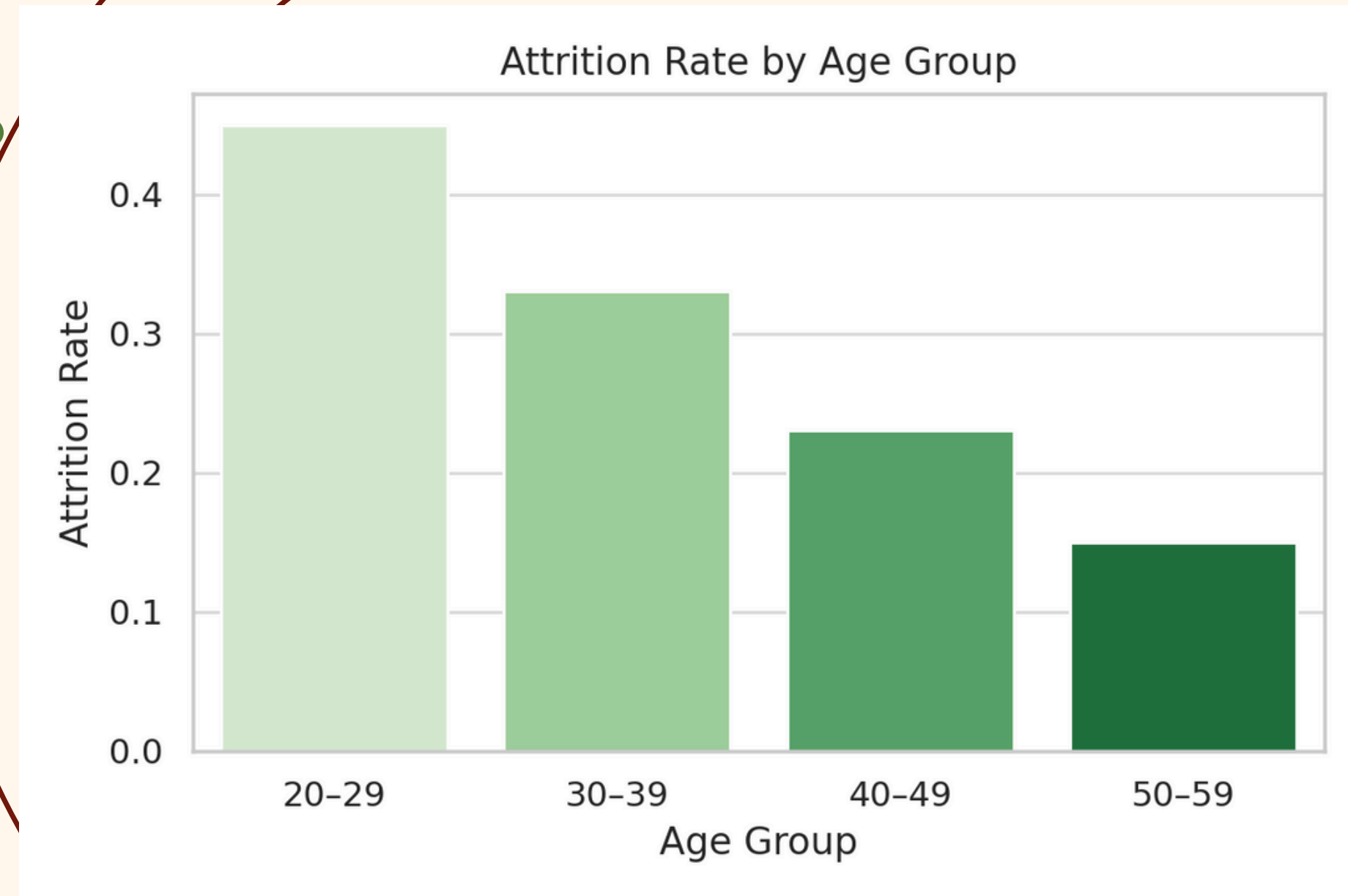
DEPARTMENT-BASED RECOMMENDATIONS

- Education (High Attrition):
  - Wellness & workload management
  - Schedule flexibility
  - Recognition programs (grants, awards)
- Media & Healthcare:
  - Media: Autonomy and creative recognition
  - Healthcare: Support for emotional well-being, shift scheduling
  - Regular engagement check-ins
- Technology:
  - R&D time, hackathons
  - Learning budgets
  - Flexible/hybrid policies
- Finance (Low Attrition):
  - Study & replicate successful policies
  - Apply structured paths to other departments.
  - Share internal success stories

FEATURE-BASED RECOMMENDATIONS

- Job Level: Role-specific coaching and progression
- Marital Status: Family-friendly policies, life-stage support
- Distance from Home: Remote/hybrid work options
- Monthly Income: Competitive & transparent compensation
- Tenure & Years at Company:
  - Milestone rewards
  - Role rotation to avoid stagnation
  - Preemptive interventions at risk points (1, 3, 5 years)
- Age: Tailored strategies by career stage
- Work-Life Balance: PTO enforcement, wellness training
- Education Level: Upskilling, role alignment
- Remote Work: Fair promotion access, virtual engagement
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THANK YOU