

# THE IDENTIFICATION OF 'AT-RISK' GROUPS FOR TRANSPORT-RELATED FATALITIES ACROSS 4 SOUTH AFRICAN CITIES

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## 1. INTRODUCTION

Road traffic fatalities as a leading cause of non-natural deaths, pose an enormous threat to the public health care sector globally (Harruff, 1998; Forjuoh, 2003; Olukoga, 2003; Santamarina-Rubio, Perez, Ricart, Arroyo, Castella, & Borrell, 2007). Worldwide an estimated 1.18 million people died as a result of traffic related injuries in 2002 (WHO, 2003). The Road Traffic Management Corporation (RTMC) estimated costs of up to R632 million (6.12%) from R10.33 billion in 2005 to R10.96 billion in 2006. Contributory factors leading to fatal crashes include, excessive speeding, drinking and driving, failure to wear seatbelts and adhere to traffic signs (GRSP, 2004). Global burden of disease data estimates that, road traffic accidents will be ranked as the third leading cause of disease ahead of other diseases such as tuberculosis and HIV/Aids by the year 2020 (WHO, 2003). Following these observations we report on a study that aimed to determine particular at-risk groups for traffic related fatalities in four South African cities.

## 2. OBJECTIVES

The aim of this study was to identify the 'at - risk' groups that resulted from transport related fatalities in the 4 South African cities, namely Johannesburg, Durban, Pretoria and Cape Town over a four year period 2001-2004

## 3. MATERIAL AND METHODS

Using the National Injury Mortality Surveillance System (NIMSS) - Road traffic injury data from the 4 cities namely Pretoria, Cape Town, Johannesburg and Durban between 2001 and 2004 were analysed

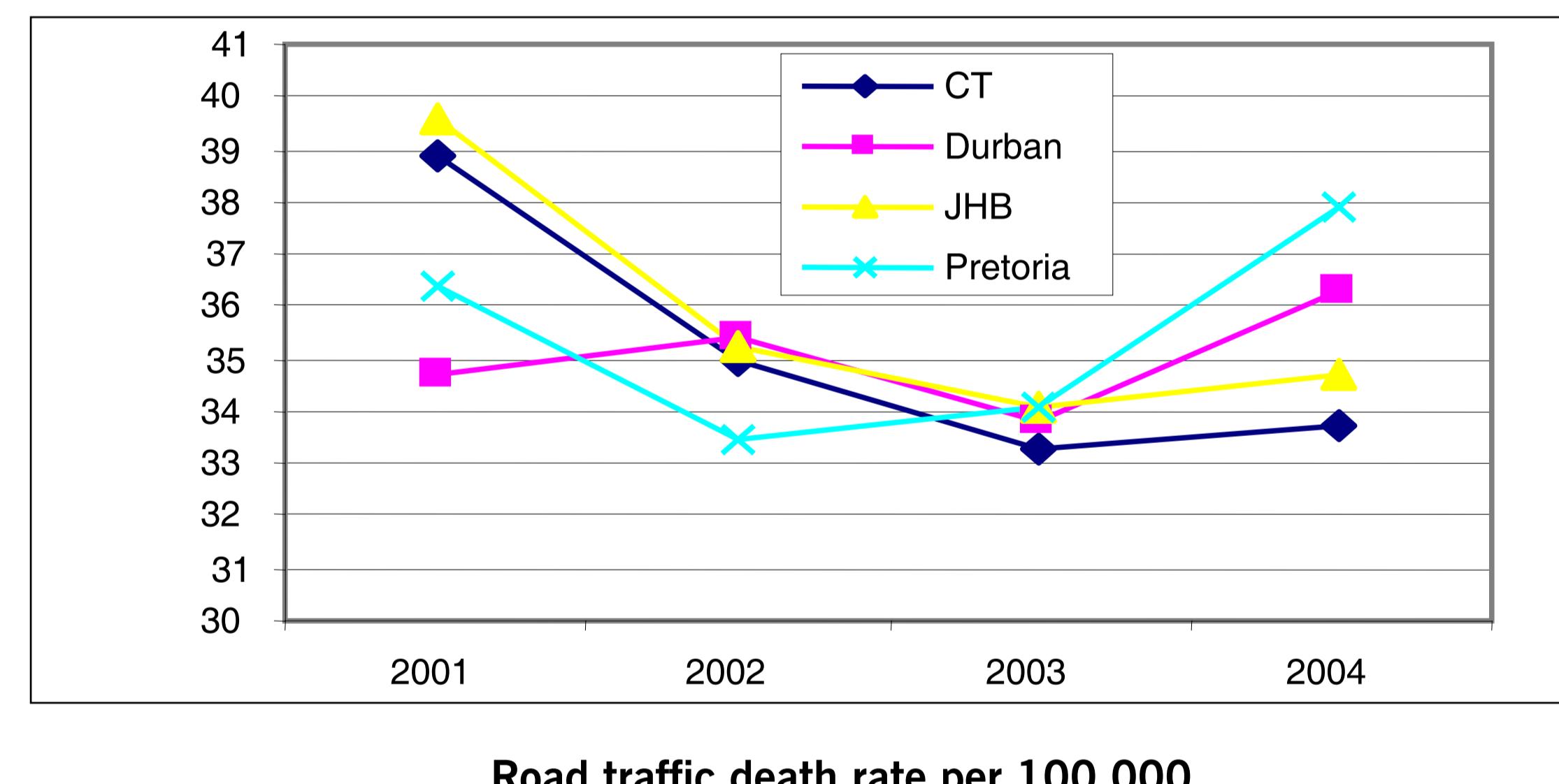
Five types of road users were identified;

- Passengers
- Pedestrians
- Drivers
- Motorcyclists/bicyclists
- Train commuters

### 3a. Methods of Analysis

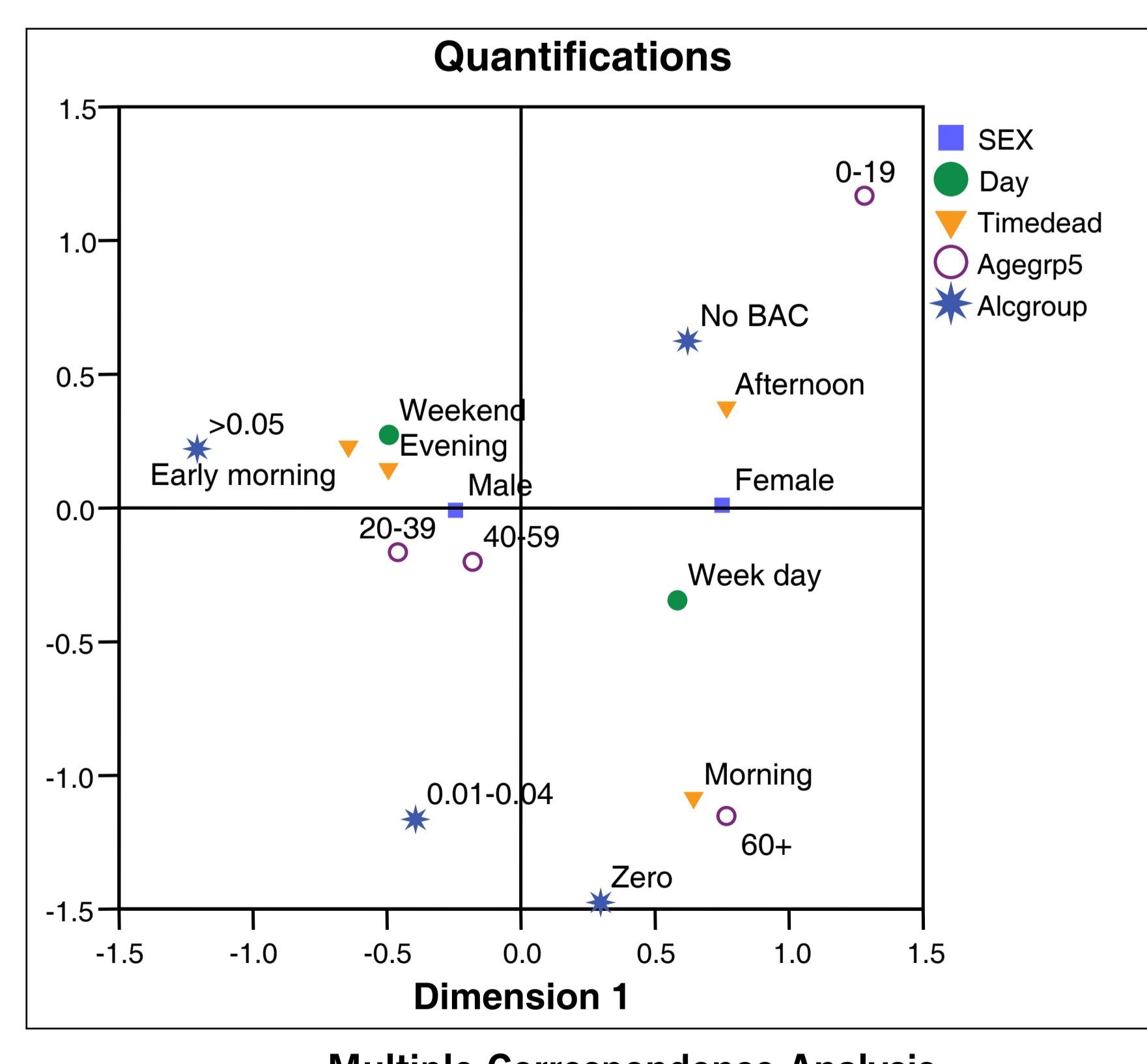
- Descriptive Statistics, Multiple Correspondence Analysis (MCA), and Two step cluster analysis were used to analyse the data
- The MCA was used as it organises variables into a table (may also be described as a weighted principle component analysis). The table organises similarities between individuals and creates links between variables, into geometrical distances that are displayed in a graphic format (Fontaine & Gourlet, 1997)
- A two-step cluster analysis categorises individuals into groups according to the most salient characteristics. As a result homogenous categories of each road user type were identified.

## 4. RESULTS



Over a 4 year period 16, 166 transport related deaths were registered across all 4 cities (2001-2004)

### 4.1. Results - Pedestrians

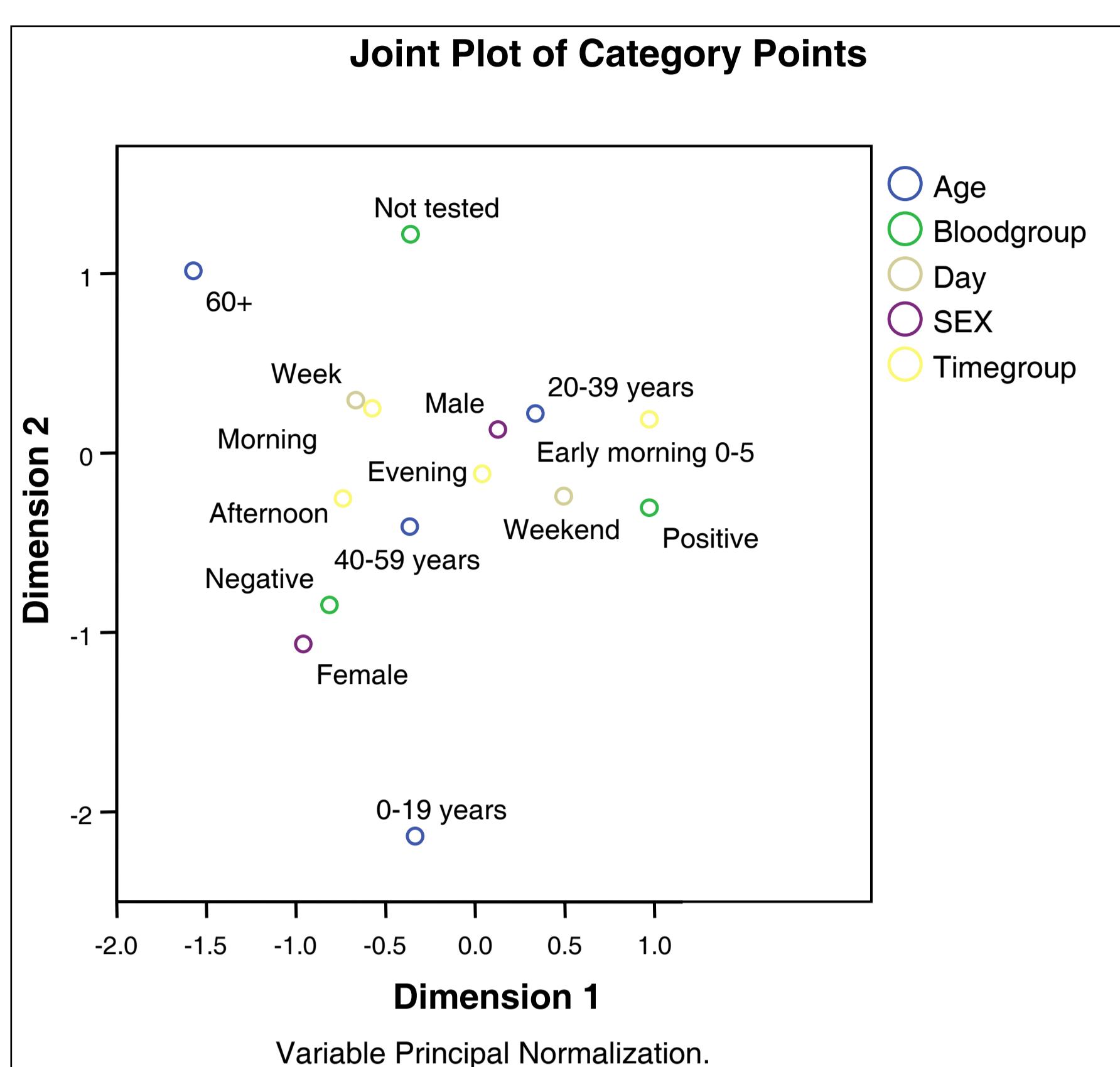


#### Risk group 1 - Pedestrians

Results Two Step Cluster Analysis:

- **Category 1:** Male pedestrians between the ages of 20-59 years with high blood alcohol concentrations were increasingly involved in accidents during the evening and early morning over the weekend
- **Category 2:** Female and elderly pedestrians were involved in accidents during the morning and afternoon (in the week)
- **Category 3:** Children, adolescents and young adult pedestrians were involved in fatalities in the afternoon/during the week

### 4.2. Results - Drivers



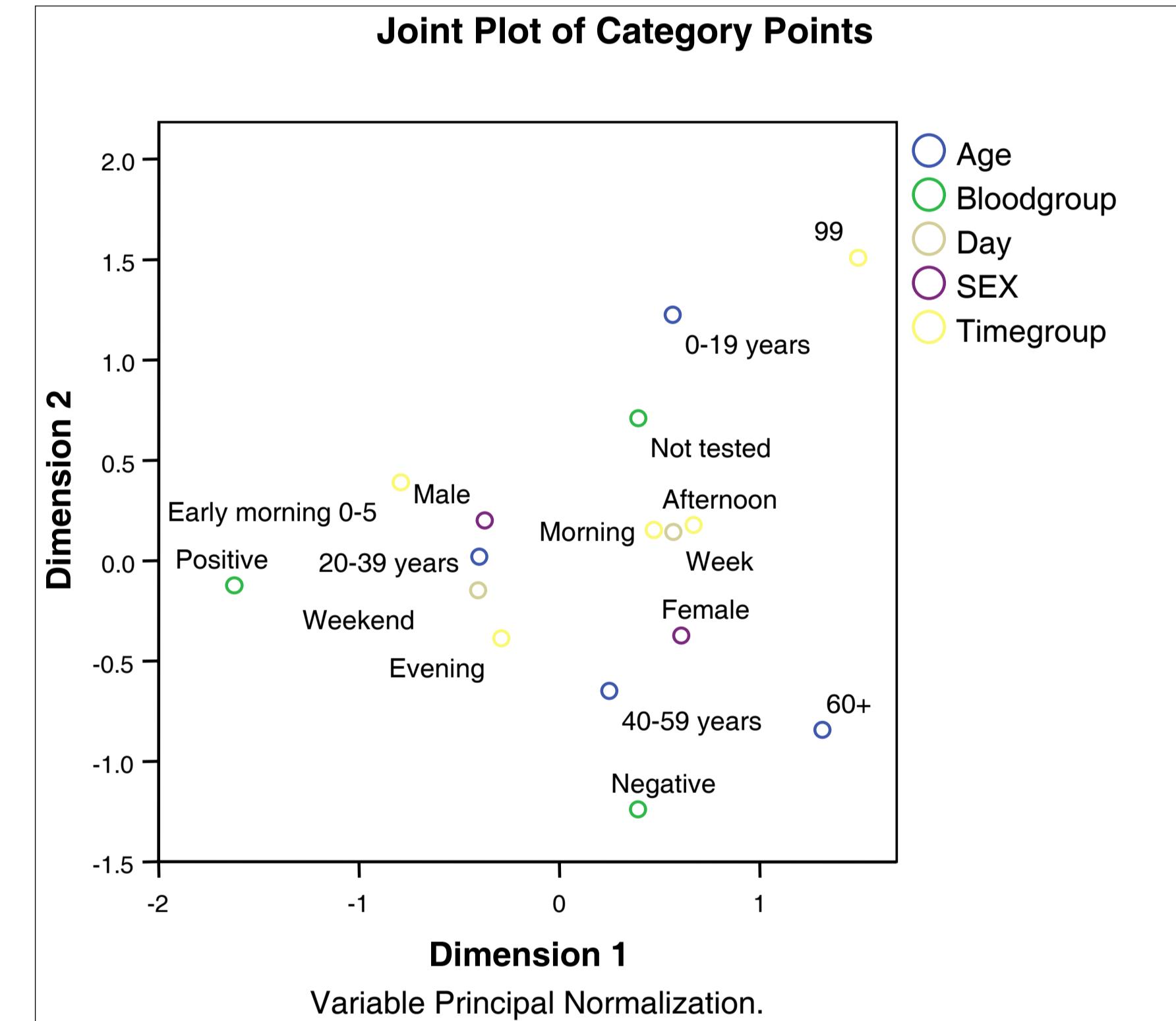
#### Multiple Correspondence Analysis

#### Risk group 2 - DRIVERS

Results Two Step Cluster Analysis:

- **Category 1:** This cluster consisted of a large percentage of females (42.9%) between the ages of 20-39 (36.5%) and 40-59 (33.8%). Deaths occurred fairly evenly over the weekend (28.6%) and during the week (26.7%). The morning (39.7%), afternoon (31.1%) were the times of the day that most deaths occurred. Majority of the group tested negative for BAC (68.7%)
- **Category 2:** This cluster consisted of males (38.6%). Ages of these individuals were spread across each of the four age categories (0-19; 20-39; 40-59; 60+). Deaths occurred over the week and during weekend. Majority of the group was not tested for BAC while moderate percentages were tested negatively for BAC (22.6%)
- **Category 3:** The third cluster consisted of 34.8% males and 23% females, 20-39 and 40-59 year olds were characteristic of this group. Most deaths occurred over the weekend during the early morning and evening. Majority of this cluster tested positive for alcohol consumption (BAC)

### 4.3. Passengers



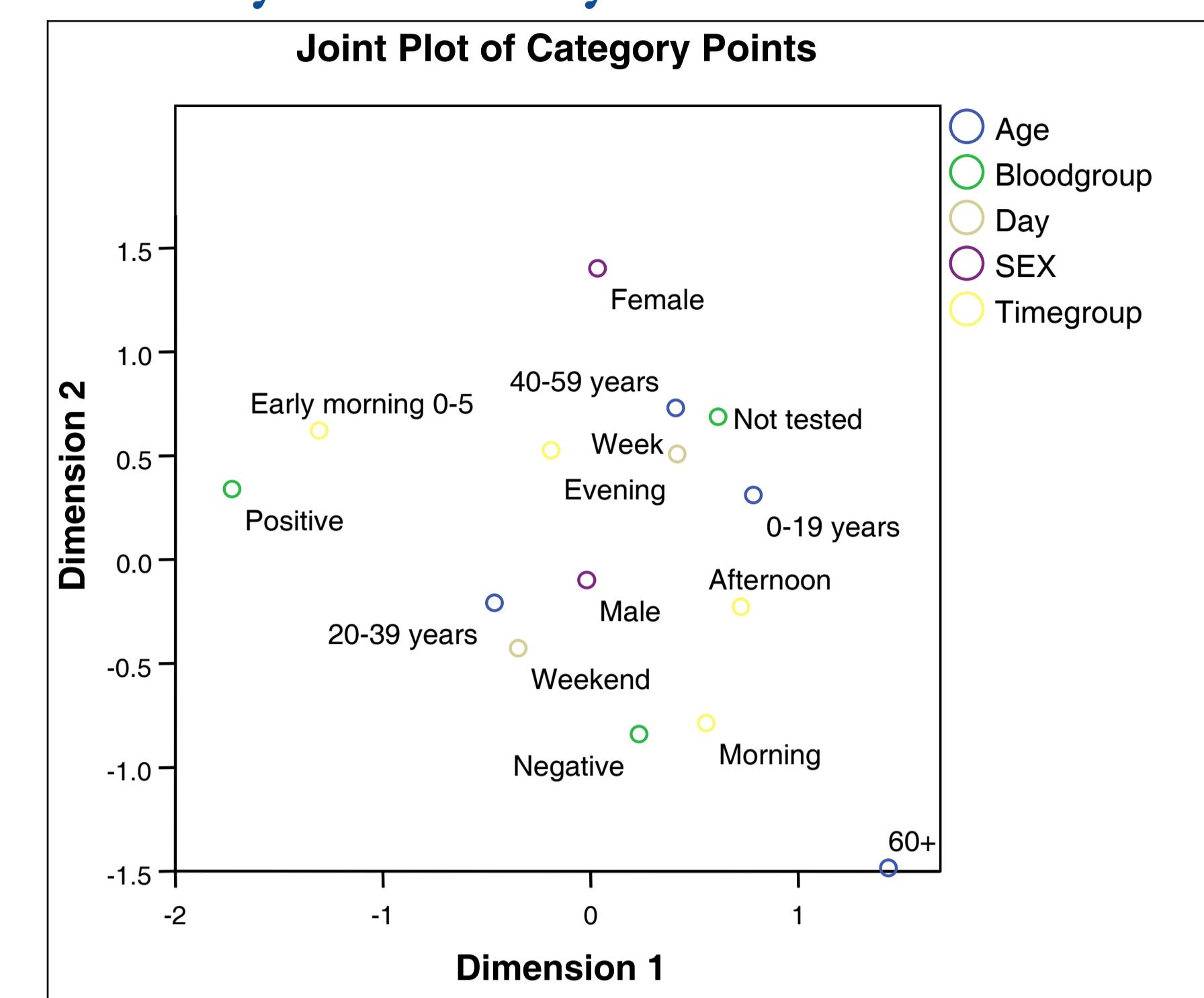
#### Multiple Correspondence Analysis

#### Risk group 3 - Passengers

Results Two Step Cluster Analysis:

- **Category 1:** A large percentage of females were characteristic of this category (88.9%). During the week (35.4%), were the times in most deaths occurred. The deaths occurred in the morning and afternoon. Age categories for this cluster were broad; the predominant age categories were 0-19 years. A large percentage of the group tested negative (44.4%), 17.2% tested positive and 32.8 % were not tested.
- **Category 2:** Males (34.9%) and females (7.7%) between the ages of 0-19 and 40-60+ were characteristic of this cluster. Deaths occurred fairly evenly over all days of the week and during all hours of the day. Age differentials examined that, 0-19, 40-59, 60+ individuals were the greatest at risk group in terms of age. Majority of the group was not tested (33.9%) for blood alcohol
- **Category 3:** Cluster 3 was characterised by 25.1% of males in all four age categories (0-19; 20-39; 40-59; 60+). Most deaths occurred in the week, during all hours of the day. Nineteen percent of the sample were tested negative, 13.1% positive and 15.3% were not tested
- **Category 4:** The cluster was characteristic of males (40.0%) and a small percentage of females (3.4%) between the ages of 20-59. Over 44% of the deaths occurred during the weekend. The times of death occurred during all hours of the day and evening. Majority of the group (60.9%) tested positive for alcohol consumption, 19.7% were tested negative and 18.0% were not tested

### 4.4. Motorcyclists/ bicyclists



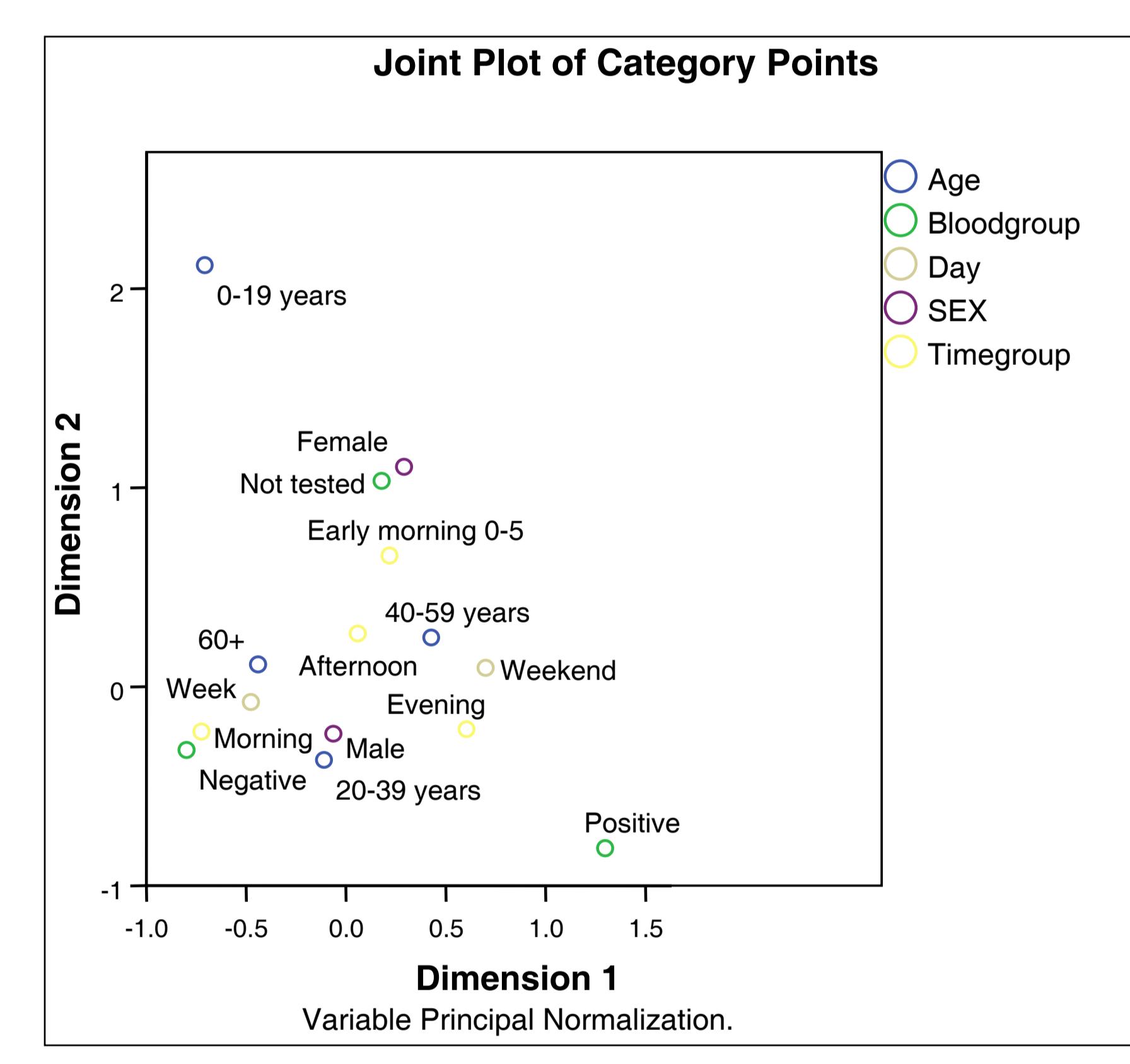
#### Multiple Correspondence Analysis

#### Risk group 4 - Motorcyclists/ bicyclists

Results Two Step Cluster Analysis:

- **Category 1:** Cyclists (male and most female victims) involved in daylight incidents over the weekend (Alcohol not involved)
- **Category 2:** Male cyclists injured during the week (includes the majority of victims younger than 20 years)
- **Category 3:** Male victims (coloured and white) with high blood alcohol concentrations involved in night time incidents (between 6pm to 6am)
- **Category 4:** Adolescent and young adult male and female cyclists with high BACs primarily involved in accidents over the weekend

### 4.5. Train commuters



#### Multiple Correspondence Analysis

#### Risk group 5 - Train commuters

Results Two Step Cluster Analysis:

- **Category 1:** Cluster 1 was comprised of 37.6% males, between the ages of 0-19, 40-59 and 60+. Fatalities occurred fairly evenly across the week and weekend. All hours of the day were regarded as times in which fatalities occurred, these ranged from 26.4% to 33.8%. Majority of the group was not tested (33.5%), 30.9% were tested positive and 28.6% negative
- **Category 2:** Males (32.9%) between the ages of 20-39 (45.0%) were at risk during the week (22.7%) as well as during the weekend (32.7%). Fatalities occurred from early morning till the evening with percentages ranging from 25.0% and 31.9%. Majority of the group were tested positive for BAC
- **Category 3:** The entire group consisted of females between the ages of 0-19 (22.0%), 20-39 (14.5%), 40-59 (25.6%) and 60+ (17.9%). Deaths occurred during the week (18.7%) and weekend (18.1%). These fatalities occurred during all hours of the day, 17.3% of the group were tested as negative, 16.3% as positive and 21.1% were not tested
- **Category 4:** Males (29.5%) between the ages of 0-19, 40-59 and 60+ were characteristic of this cluster. Train commuter fatalities occurred during the week (28.2%) and during the weekend (18.4%). Incidents occurred during all hours of the day, from early morning to evening. All individuals in the cluster tested negative for alcohol consumption

## 5. CONCLUSION

- The current study has proven that pedestrians are at the highest risk, these results concur with previous international studies that have also identified pedestrians as the most vulnerable group
- Between 2001 and 2004, pedestrians accounted for the largest percentage of traffic related deaths (45.94%)
- Males aged between 20 - 49 years accounted for 81.1% of all road traffic related deaths
- Strategies for prevention need to focus directly on each of the four groups
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