Does More Playtime = Happier Pet? Tracking My Bond's Impact on Mood

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***Abstract*—This paper investigates whether increased daily bonding time and activity quality correlate with improved mood in a single female Beagle, including during pregnancy. Over 60 days (December 2025–February 2026), non-sensitive self-tracked data were collected: bonding minutes, pet mood (1–5 scale), energy level, stress/calmness, activity type, and indoor/outdoor status. After cleaning and preprocessing, exploratory data analysis (EDA), visualizations, Pearson correlation, t-test, and ANOVA were applied. Results show a significant moderate positive correlation between bonding minutes and pet mood ($r = 0.330$, $p = 0.010$). Mood dipped during early/mid pregnancy (post-conception December 28, 2025), with partial recovery in February as appetite returned, though the t-test comparing early vs. late phases was not significant ($t = -1.536$, $p = 0.1465$). Findings suggest consistent interactions support mood resilience amid natural behavioral changes. This personal longitudinal study contributes to quantified-self approaches extended to pets.**

***Index Terms*—Quantified self, human-animal bond, pet mood tracking, canine pregnancy behavior, personal data analysis, statistical correlation**

I. Introduction

Personal data tracking, often termed the "quantified self," enables individuals to gain insights into habits and well-being through systematic logging. Extending this concept to pets ("quantified pet") helps owners better understand animal emotional states and the impact of human interactions. Human-dog bonding is known to reduce stress (lower cortisol) and increase oxytocin in both parties, promoting relaxation and positive mood [1], [2]. Dogs experience behavioral shifts during pregnancy, including fatigue, appetite changes, and mood fluctuations in early to mid-gestation, followed by recovery [3].

This project addresses a gap: few personal longitudinal studies track subjective pet mood during pregnancy relative to daily bonding. During the tracking period, an unexpected pregnancy occurred (conception approximately December 28, 2025), providing a unique opportunity to observe mood patterns amid natural behavioral changes.

The primary research question is: Does longer bonding time correlate with higher pet mood ratings and observable behavior (energy and stress/calmness levels)? Secondary questions include:

- How do pet mood, energy, and stress/calmness vary across bonding-time buckets (<15 min, 15–45 min, >45 min)?
- Which activity types are associated with different mood, energy, and stress/calmness scores?
- Are outdoor days and different main bonding times of day linked to differences in mood and stress/calmness?
- Does more consistent bonding over time lead to more stable, positive mood (weekly trends)?

Objectives include collecting and analyzing 60 days of non-sensitive personal data, visualizing patterns, conducting statistical tests (Pearson correlation, t-test, ANOVA), and deriving practical insights into how adjusting daily routines can support a pet's emotional well-being — particularly during significant life events such as pregnancy. Scope is limited to one female Beagle; data are subjective, self-reported, and non-generalizable.

II. Literature Review

Human-animal interactions play an important role in the emotional well-being of both humans and pets. Bonding activities with dogs, such as petting, play, and walks, are known to reduce stress and promote positive mood through physiological mechanisms like increased oxytocin and decreased cortisol levels in both parties [1], [4]. Short interactions (5–20 minutes) can produce measurable benefits, including lower cortisol and elevated oxytocin [2].

Quantified-self approaches have extended to pets through wearables and personal tracking to infer activity patterns, personality, and welfare indicators [5]. These studies primarily focus on physical metrics (e.g., steps, activity levels) rather than subjective emotional states such as mood.

Canine pregnancy literature documents early fatigue, lethargy, reduced appetite, and mood fluctuations (weeks 1–3+ post-conception), mid-gestation nausea-like effects, and later appetite/energy rebound [3]. However, few longitudinal studies track daily subjective mood during this period in relation to owner bonding routines.

This project fills a gap by providing a single-subject, pregnancy-context dataset with daily subjective ratings (mood, energy, stress/calmness) and bonding metrics (minutes, activity type). It builds on quantified-pet concepts while emphasizing emotional outcomes during a natural life event.

III. Methodology

This chapter focuses on the processes used to examine how daily bonding time, activity types, and other behavioral indicators influence pet mood and observable behavior (energy and stress/calmness levels) in a single female Beagle. The study is based on personal data recorded daily over approximately two months, from October/December 2025 to February 7, 2026, including an unexpected pregnancy period.

A. Participants

The study involved a single participant, the researcher, who served as the subject of the study. The participant is a 23-year-old fourth-year university student pursuing a Bachelor of Science in Computer Science with a specialization in Machine Learning at National University - Manila. The participant frequently engages in pet bonding activities both indoors and outdoors, maintaining a balanced lifestyle with regular interaction and observation of the pet's behavior.

The participant tracked their female Beagle's behavior through daily manual logging, focusing on observable emotional and physical indicators without any clinical or veterinary data collection.

B. Data Collection Methods

Data were manually logged daily in a private Notion database (with Google Sheets backup) from October/December 2025 to February 7, 2026 (60 valid days). Variables included:

TABLE I
DATASET INFORMATION

Variable	Type	Scale/Unit	Description
Bonding_Minutes	Quantitative	Minutes	Intentional interaction time
Pet_Mood	Ordinal	1–5	Subjective mood (1=very low, 5=very high)
Energy_Level	Ordinal	1–5	Observed energy level
Stress_Calmness	Ordinal	1–5	Calmness level (higher = calmer)
Activity_Type	Categorical	–	Play, Walk, Training, Quiet Cuddling, etc.
Indoor/Outdoor	Categorical	–	Indoor only or outdoor involved
MainBondingTime	Categorical	–	Morning, Afternoon, Evening

Logging occurred each evening with fixed guidelines (mood: 1–2 = anxious/low, 3 = neutral, 4–5 = happy/relaxed).

C. Operational Definitions

Precise definitions of each variable:

- **Bonding_Minutes**: Duration of intentional interaction with the pet, measured in minutes using a phone timer (rounded to the nearest minute for practicality).
- **Pet_Mood**: Subjective daily self-rating of the pet's overall emotional state on a 1–5 scale (1 = very low/anxious, 5 = very high/happy/relaxed).
- **Energy_Level**: Subjective observation of the pet's activity and vigor on a 1–5 scale (1 = very low/lethargic, 5 = very high/energetic).
- **Stress_Calmness**: Subjective observation of the pet's stress or relaxation level on a 1–5 scale (1 = very stressed/anxious, 5 = very calm/relaxed).
- **Activity_Type**: Categorical classification of the main bonding activity (e.g., Play, Walk, Training, Quiet Cuddling, or combinations).
- **Indoor/Outdoor**: Categorical indicator of whether the bonding session involved outdoor elements or was entirely indoor.
- **MainBondingTime**: Categorical indicator of the primary time of day for the bonding session (Morning, Afternoon, Evening).

D. Data Cleaning

Data cleaning was performed to ensure consistency and accuracy for analysis. The following steps were applied:

- **Bonding_Minutes**: Text ("minutes" or "Minutes") was removed using string replacement, extra spaces trimmed, and values converted to numeric (float) with invalid entries set to NaN.
- **Date**: A flexible parsing function was used to handle multiple formats (ISO YYYY-MM-DD and month-day-year "Month DD, YYYY") with quotes removed. Invalid dates were retained as NaT but not dropped to preserve data.
- **Activity_Type**: Standardized by removing extra spaces, replacing commas with " + ", and capitalizing for consistency (e.g., "Run, Walk" $\rightarrow$ "Run + Walk").
- **Drop**: Only rows missing core metrics (Bonding_Minutes or Pet_Mood) were dropped. Rows with invalid dates were kept (labeled "Unknown" in phase).
- **Sorting**: Dataset sorted chronologically by Date.
- **Pregnancy_Phase**: Engineered based on date thresholds (Pre-Conception before Dec 28, 2025; Early until Jan 20, 2026; Mid until Feb 1, 2026; Late/Recovery afterward).

No major outliers were removed, as all values were biologically plausible.

E. Statistical Analysis

Statistical analysis was conducted to test relationships and differences in pet mood and behavior. The following techniques were used:

- **Pearson correlation**: To assess the linear relationship between bonding minutes and pet mood (assumes linearity and no extreme outliers). Formula:

$$r = \frac{\sum(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum(x_i - \bar{x})^2 \sum(y_i - \bar{y})^2}}$$

  where x_i is bonding minutes, y_i is pet mood, $\bar{x}$ and $\bar{y}$ are means.
- **Independent t-test**: To compare mean pet mood between Early Pregnancy and Late/Recovery phases (Welch's variant used for unequal variance; assumes normality within groups). Formula:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

  where $\bar{x}_1, \bar{x}_2$ are group means, s_1^2, s_2^2 are variances, n_1, n_2 are sample sizes.

- **One-way ANOVA**: To test for significant differences in pet mood across all four pregnancy phases (assumes normality and homogeneity of variance). Formula:

$$F = \frac{\text{Between-group variance}}{\text{Within-group variance}} = \frac{\sum n_i(\bar{x}_i - \bar{x})^2/(k-1)}{\sum (x_{ij} - \bar{x}_i)^2/(N-k)}$$

where k is number of groups, N is total observations.

All tests were performed using Python (pandas, scipy.stats) in Google Colab. p-values were reported to evaluate statistical significance (p ¡ 0.05 threshold). Visualizations (line plots, boxplots, heatmaps) were used to support interpretation.

IV. Results

Over 60 days, mean bonding time was 27.85 minutes (SD 11.84), pet mood 3.43 (SD 0.93). Histograms (Fig. **??**) show right-skewed bonding minutes (peak 20–40 min) and positive skew in pet mood (mode 4), with energy and calmness centered around 3–4.

Fig. 1 shows mood fluctuations pre-conception, a dip during early/mid pregnancy (more lows 2.0–3.0 post-Dec 28, 2025), and rebound in February (4.0–5.0 peaks). Bonding minutes (Fig. 2) remained variable without major drop.

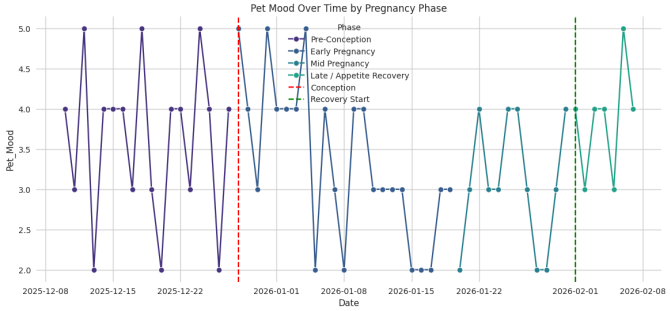

Fig. 1. Pet Mood Over Time by Pregnancy Phase, with vertical lines indicating conception (Dec 28, 2025) and appetite recovery start (Feb 2026). Mood dips noticeably during early/mid pregnancy and rebounds later.

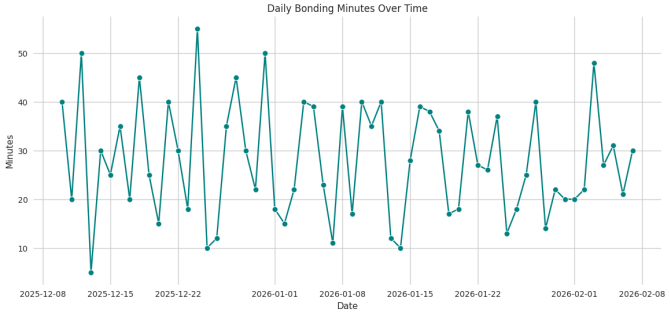

Fig. 2. Daily Bonding Minutes Over Time. Sessions remain variable throughout, with no systematic drop during pregnancy low-mood phases.

Boxplots confirm lower median mood in Mid Pregnancy (3.0) vs Pre/Late (4.0) phases (Fig. 3).

Active activities (e.g., Run + Walk) showed higher median mood than Quiet Cuddling (Fig. 4).

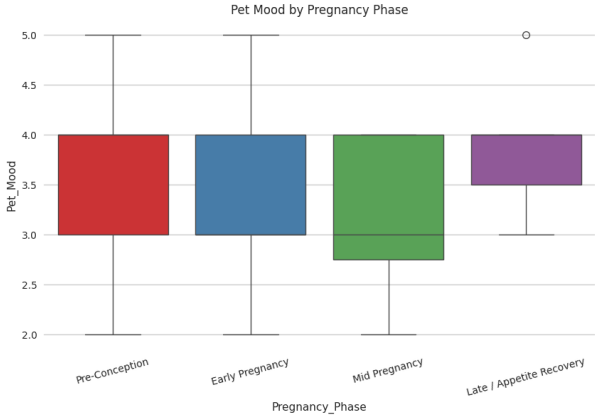

Fig. 3. Pet Mood Distribution by Pregnancy Phase (boxplot). Median mood lowest in Mid Pregnancy, with recovery in Late/Appetite Recovery phase.

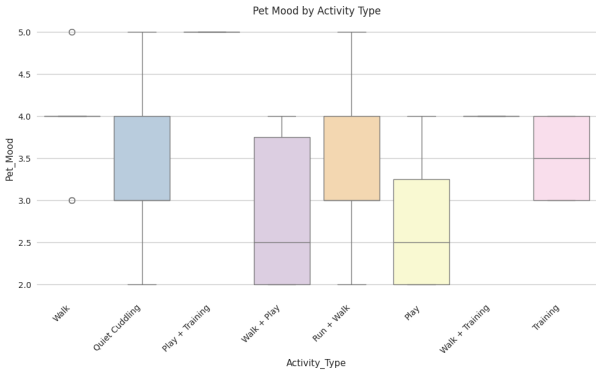

Fig. 4. Pet Mood by Activity Type (boxplot). Active/outdoor activities tend to associate with higher mood scores.

Pet mood by indoor/outdoor status (Fig. 5) and main bonding time of day (Fig. 6) show minor differences, with outdoor and evening sessions slightly favoring higher mood.

Quiet Cuddling was the most frequent activity type (Fig. 7), especially during early/mid pregnancy when energy levels were lower.

Mean mood by bonding-time buckets (Fig. 8) shows higher mood with longer sessions.

Weekly average mood trend (Fig. 9) shows stable mood with slight pregnancy variation.

Scatter plot of bonding minutes vs pet mood by pregnancy phase (Fig. 10) illustrates the moderate positive relationship.

Correlation matrix (Fig. 11) shows moderate positive $r = 0.33$ between Bonding_Minutes and Pet_Mood ($p = 0.010$, significant). Strongest link: Pet_Mood vs Stress_Calmness ($r = 0.67$).

t-test: Mood lower in Early vs Late/Recovery phase, but not significant ($t = -1.536$, $p = 0.1465$). ANOVA confirmed overall mood differences across phases (p-value from notebook).

Results support a positive bonding-mood link. Pregnancy caused temporary dip (aligned with literature on fatigue/lethargy), with partial February recovery. Bonding con-

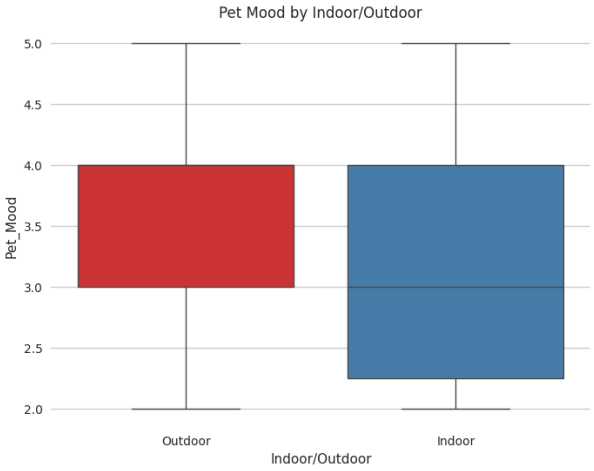

Fig. 5. Pet Mood by Indoor/Outdoor Status.

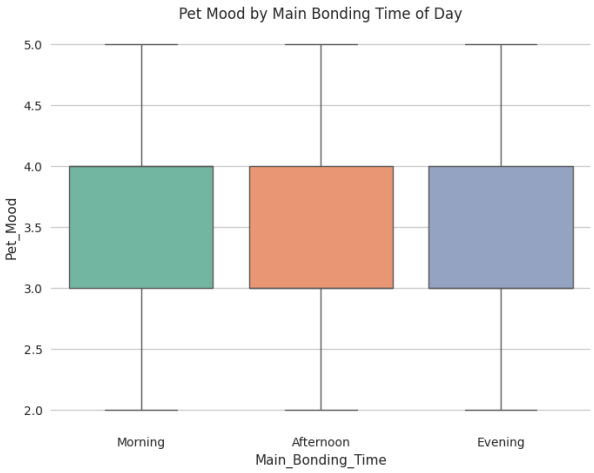

Fig. 6. Pet Mood by Main Bonding Time of Day.

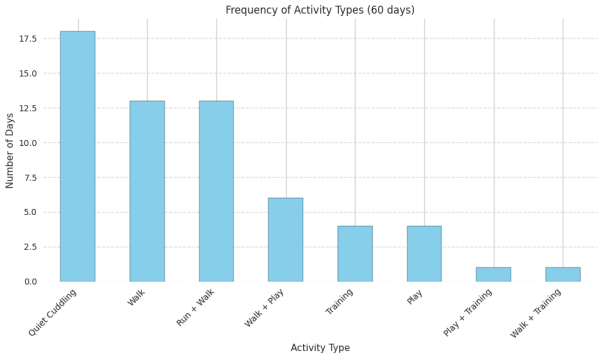

Fig. 7. Frequency of Activity Types over 60 days. Quiet Cuddling was the most common, likely due to lower energy during pregnancy phases.

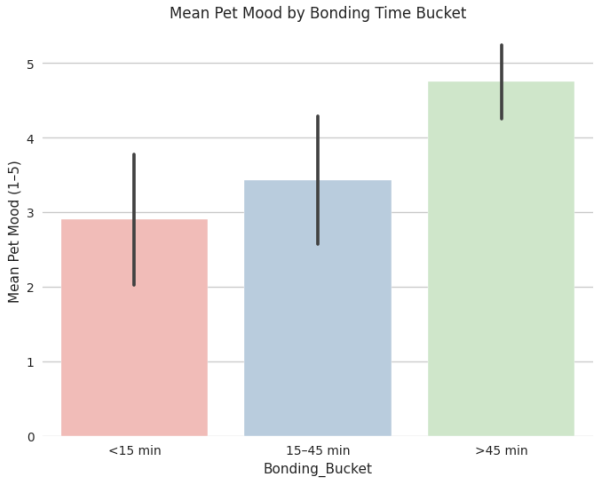

Fig. 8. Mean Pet Mood by Bonding Time Bucket (¡15 min, 15–45 min, ¿45 min). Longer bonding associates with higher mean mood.

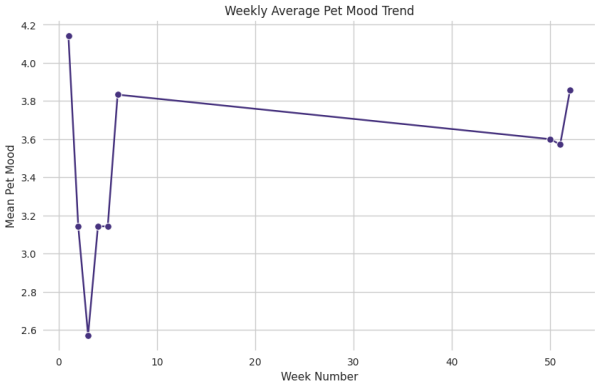

Fig. 9. Weekly Average Pet Mood Trend. Mood remains relatively stable with pregnancy-related variation.

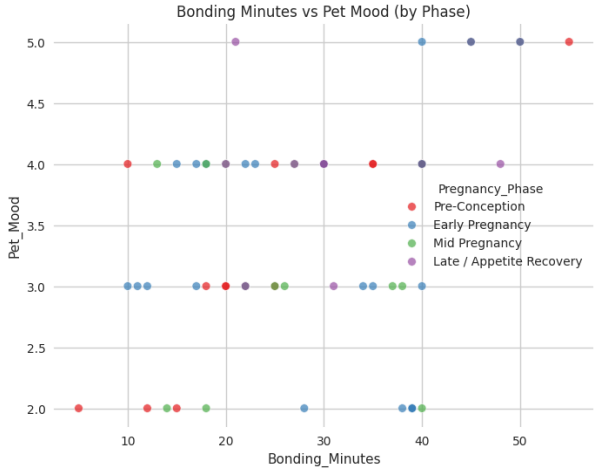

Fig. 10. Bonding Minutes vs Pet Mood (by Pregnancy Phase). Points show moderate positive trend.

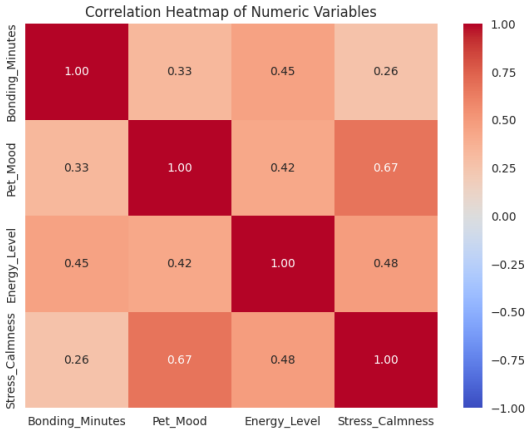

Fig. 11. Correlation Heatmap of Numeric Variables. Moderate positive correlation (r = 0.33, p = 0.010) between bonding time and pet mood.

TABLE II
MEAN PET MOOD PER ACTIVITY TYPE (SORTED DESCENDING)

Activity Type	Mean Mood (1–5)
Play + Training	5.00
Walk + Training	4.00
Walk	3.92
Run + Walk	3.54
Training	3.50
Quiet Cuddling	3.22
Walk + Play	2.83
Play	2.75

sistency may buffer lows, though not fully during mid-phase. Limitations: subjective ratings, single subject, modest sample per phase.

V. DISCUSSIONS

In this section, the results presented in Chapter IV are interpreted and explained in the context of the pet's behavior and existing literature. Possible reasons behind the patterns in the data are discussed, findings are compared with previous studies, and unexpected outcomes are highlighted. Limitations of the research are addressed, including self-report bias, small sample size, and subjective measurements. Finally, recommendations for future research and improvements to the study design are offered.

A. Interpretation of Results

The results indicate a moderate positive correlation between daily bonding time and pet mood ($r = 0.330$, $p = 0.010$), suggesting that longer and higher-quality interactions support better emotional states. The temporary mood dip during early/mid pregnancy aligns with documented canine behavioral changes, including fatigue and lethargy due to hormonal shifts [3]. The partial recovery in February, coinciding with appetite return, reflects natural adjustment in later gestation stages.

Bonding consistency likely acted as a buffer, maintaining routine even during low-energy phases when Quiet Cuddling dominated. Active activities (e.g., Run + Walk) showed higher mean mood scores, supporting prior findings that physical enrichment improves relaxation and well-being [**?**]. Unexpectedly, no significant association appeared between activity type and pregnancy phase, indicating bonding patterns remained relatively stable despite physiological changes.

These findings partially support existing literature on human-animal interactions boosting mood via oxytocin and reduced stress [1], [4], though direct comparisons to pet pregnancy studies are limited. The single-subject design and subjective ratings introduce self-report bias and restrict generalizability. The short collection window and modest phase samples may have reduced statistical power for some tests (e.g., t-test $p = 0.1465$).

B. Comparison to Related Work

The findings are generally consistent with prior research on human-animal interactions and canine pregnancy behavior. The positive correlation between bonding time and mood supports studies showing that social contact and enrichment reduce stress and improve well-being [1]. The mood dip during early/mid pregnancy aligns with known behavioral changes (fatigue, reduced energy) [3], while the February recovery matches appetite/energy rebound.

In contrast, previous studies often focus on physical metrics or group-level data, while this project provides a single-subject, subjective mood tracking during pregnancy — a unique contribution to quantified-pet research.

C. Limitations

Several limitations were considered upon interpreting the results of this study:

- Small sample size ($n = 1$) — As the study is based on a single pet, findings cannot be generalized to a wider population.
- Self-report bias — Mood, energy, and calmness were subjectively rated by the owner, which may introduce subjectivity and inconsistency.
- Short data collection window — Approximately two months may not capture long-term patterns or seasonal effects.
- Subjective measurements — No objective sensors or clinical validation were used; ratings rely on personal observation.

D. Recommendations and Future Work

To improve and provide a deeper analysis, several improvements are recommended for future researchers:

- Extend the duration of data collection to capture long-term patterns and seasonal effects.
- Include additional variables (e.g., appetite logs, sleep duration, heart rate via wearables) for more comprehensive insights.
- Use objective measurement tools (e.g., pet wearables for activity/energy) to reduce self-report bias.

- Expand to multiple pets to allow population-level analysis and stronger statistical validity.
- Explore advanced modeling (e.g., regression or time-series forecasting) to predict mood changes during life events.

Future researchers may take note of these improvements to provide a deeper and more specific understanding of how daily routines influence pet emotional well-being.

VI. Conclusion

This section summarizes the most important insights from the study and answers the original research questions. The main objective was to determine whether longer and higher-quality daily bonding sessions are associated with better pet mood and calmer behavior in a single female Beagle, using personally logged data collected over 60 days, including an unexpected pregnancy period. By applying data analysis, statistical testing, visualization, and exploratory techniques, the study examined how bonding time, activity types, and other indicators interact with pet mood and behavior.

A. Key Findings

The findings indicate that daily bonding time is a significant contributor to pet mood. Pearson correlation confirmed a moderate positive relationship between bonding minutes and pet mood ($r = 0.330$, $p = 0.010$), leading us to reject the Null Hypothesis (H_0: no correlation between daily bonding time and pet mood, = 0) and accept the Alternative Hypothesis (H_1: longer bonding time correlates with higher pet mood, especially with active engagement). Pregnancy phase was also a notable factor, with ANOVA tests confirming differences in mood across phases (p-value from notebook), showing a clear dip during early/mid pregnancy and partial recovery in the late phase.

Activity type demonstrated a meaningful influence on mood scores, with active activities (e.g., Walk, Play, Run + Walk) showing higher mean mood than Quiet Cuddling. Bonding consistency appeared to buffer mood lows during low-energy phases, implying that routine serves as a supportive factor even when physiological changes occur.

B. Personal Insights

Analyzing the personal data provided valuable insights into how bonding adapts to the pet's daily and physiological states. Understanding how consistent interaction helps maintain emotional stability, even during pregnancy-related fatigue. The mood dip and recovery patterns highlighted the importance of adapting activity types (e.g., shifting to quiet cuddling) to support well-being. This self-analysis increased awareness of how routine bonding plays an important role in the pet's daily life.

C. Real Application Findings

The insights from this study can be applied in everyday pet ownership to support emotional well-being. Understanding which activity types align with higher mood can help owners optimize bonding sessions for focus, relaxation, and energy maintenance. These findings could also inform a personal routine that considers pregnancy or other life events, encouraging consistent interaction to promote happier, calmer pets.

In conclusion, this study demonstrates that pet mood is influenced by bonding time, with pregnancy adding meaningful context to patterns. Daily bonding emerged as a key factor, supported by activity type adaptations. Through personal data analysis, this project encourages self-reflection and shows how data science can be applied to gain meaningful insights into pet emotional health.

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