May 28 - Starting with sport community written blogs/articles to learn how sport enjoyers think about comebacks, build some background knowledge/vocabulary, and form questions:

- Unforgettable Football Comebacks: Stories of Resilience That Changed History
    - Team cohesion is the first thing that is brought up in this article, I hadn't really thought about it before reading about it here. I wonder how this differs among different sports, how much does team cohesion actually affect the ability for a comeback? How can this be quantified before and during a comeback attempt?
    - "Mental factors that contribute to successful comebacks include:
        - Resilience — the ability to bounce back from setbacks;
        - Focus on controllable elements rather than the scoreline;
        - Breaking the challenge into smaller, manageable goals;
        - Leadership from key players who refuse to accept defeat;
        - Belief in team training and preparation."
            - Good foundational list of some mental factors that contribute to comebacks, Noteworthy (to me at least) how much these factors align with coping strategies in staying calm in stressful work situations, or preparing for a big research project. How do these mental factors interact with each other?
    - "Players who have participated in great comebacks often describe entering a "flow state" where time seems to slow down and performance becomes instinctive rather than calculated."
        - How does the flow state change when a team is down and needs to come back? Is the "flow state" experienced during a comeback truly the same as a general flow state, or is it a more specific "clutch state"?
    - Main takeaway here: Comebacks don't really happen naturally. They have to be curated and practiced for.

- Psychological Momentum
    - "In sports, psychological momentum is often described as being "in the zone" or experiencing a "winning streak." Athletes who experience positive momentum often report heightened focus, reduced anxiety, and an overall sense of being unstoppable."
        - Is this momentum the same thing as the flow state? Or different things that play into one another?
            - More specifically: What are the theoretical and empirical distinctions between psychological momentum, flow state, and "clutch state"? Are they hierarchical (e.g., flow is a component of momentum), sequential (e.g., flow leads to momentum), or overlapping phenomena?
    - "Research has consistenly shown that psychological momentum can significantly impact both individual and team sports. For example, athletes who perceive themselves as having psychological momentum typically report higher levels of

self-efficacy and performance satisfaction. And teams with positive momentum are more likely to cooperate effectively, leading to improved overall performance
        - What are the most effective and reliable methods for quantitatively measuring perceived psychological momentum in athletes and teams during a game?
    - "Positive emotions, such as joy and satisfaction, can enhance cognitive functioning and increase motivation, contributing to a sense of momentum. Conversely, negative emotions, such as frustration and anxiety, can disrupt cognitive processes and hinder performance, leading to negative momentum."
        - Based on what Sydney said about her research, I wonder how many athletes are actually using those negative emotions as drivers for psychological momentum?
        - Do different sporting cultures or fan bases perceive psychological momentum differently, and how might this impact athlete experiences or media narratives?

- Self efficacy in sport and exercise: Determining effort, persistence and performance - BelievePerform - The UK's leading Sports Psychology Website
    - "How well one believes they can organise and execute courses of action enabling the attainment of successful performance is not based on the skills one has, but what the individual believes they can achieve with the skills (Bandura, 1986)."
        - So, it's not just about having skills, but about believing in one's ability to effectively use those skills. This is highly relevant for comebacks, as a team might possess the necessary skills but falter if their collective belief in executing them under pressure is low. Are there different psychological interventions for teams with skill deficits versus teams with self-efficacy deficits during comebacks?
    - "Performance accomplishments are the most influential source of self efficacy information (Bandura, 1997), with strong efficacy expectations developed through continual successful performances. Greater self efficacy derived from previous performance accomplishment determines sustained effort and persistence, which is key to overcoming occasional failures, ultimately improving performance."
        - This explains the positive momentum and confidence boost observed after catching up, as these mini-victories reinforce belief. It also implicitly connects to the importance of breaking down the comeback into smaller, manageable goals. Is there a threshold of small accomplishments needed to trigger a major shift in collective self-efficacy during a deficit?
    - "Verbal persuasion is used frequently due to ease, with individuals persuaded that they can cope successfully with what may have overwhelmed them in the past. Individuals who are socially persuaded by coaches, parents and peers to believe they have the capabilities to achieve are more likely to exhibit greater effort and persistence, enhancing their performance (Bandura, 1977)."
        - Is there a certain threshold of verbal persuasion that leads to a comeback?

- “In terms of physiological states, simply acknowledging that physiological arousal is informative and motivating determines the levels of motivational inducements such as effort and persistence towards action (Weiner, 1972).”
    - Suggests that it's not the *level* of physiological arousal (e.g., increased heart rate, adrenaline) that matters most, but the *interpretation* of that arousal. A comeback team might interpret heightened arousal as excitement and readiness, fueling their effort. Conversely, the team losing its lead might interpret the same physiological state as anxiety or fear, leading to a performance decrement. Can mental training interventions teach athletes to consistently re-interpret high arousal as positive ("I'm excited" instead of "I'm nervous") during a critical comeback moment?

May 29/30/31 - Moving from community written sources to research papers, organizing my “big” questions, and creating my research question

1. What are the theoretical and empirical distinctions between psychological momentum, flow state, and "clutch state"? Are they hierarchical (flow is a component of momentum), sequential (flow leads to momentum), or overlapping phenomena?
    a. Flow is about effortless immersion in an activity, usually in less extreme pressure (letting it happen), clutch is about deliberate and intense effort under extreme pressure (making it happen), and psychological momentum is the perceived state of sustained success in performance.
    b. Other than psychological momentum, flow state, and clutch state, what are the other mental states that drive a comeback?
        i. Developing and evaluating a flow intervention for runners - information on flow
        ii. Toward a Theory of Emotions in Competitive Sports - Psychological Factors and Performance in Basketball: The Correlation between Motivation, Basic Needs, and Commitment - (PDF) From Setback to Comeback: The Path of Post Traumatic Growth in Sports
        iii. Reading the MAP: A Pracademic Perspective on the Current State of Play of the Multi-Action Plan Model with Regard to Transitions between Mental States - overview of interesting framework for sports psychology, Multi-Action Plan
2. Can mental training interventions teach athletes to consistently re-interpret high arousal as positive ("I'm excited" instead of "I'm nervous") during a critical comeback moment?
    a. Does the inverted-U function disappear in expert athletes? An analysis of the attentional behavior under physical exercise of athletes and non-athletes - ScienceDirect
    b. Mental training strategies in improving sport performance: A literature review.
3. What are the most effective and reliable methods for quantitatively measuring perceived psychological momentum in athletes and teams during a game?
    a. A Review of Psychological Momentum in Sports: Why qualitative research is needed.

    b. An overview of the psychological complexities in sports performance - ScienceDirect - collection of ten articles that could be useful models
4. Do different sporting cultures or fan bases perceive psychological momentum differently, and how might this impact athlete experiences or media narratives?
    a. Nobodies really writing about this specifically
5. What about how comebacks themselves are perceived? Is it different between male and female sports?
6. Also, self-efficacy, does this fall into a mental state or a personal value?
    a. Neither - Enhancing Music Performance Self-Efficacy Through Psychological Skills Training - this thesis defines it
    b. Are there different psychological interventions for teams with skill deficits versus teams with self-efficacy deficits during comebacks?
        i. Probably, look for studies on Psychological Skills Training in Sports if this question comes back up again for you
    c. Is there a threshold of small accomplishments needed to trigger a major shift in collective self-efficacy during a deficit?
        i. Again, probably, but really hard to quantify in the time you have
        ii. https://www.proquest.com/openview/9e17d1d9cfbf73b408754f9c5c5b2033/1?pq-origsite=gscholar&cbl=18750&diss=y - this thesis tries to answer that, also touches on team self-efficacy
7. How much do social aspects (team cohesion, verbal persuasions, tactical subs, media/public perceptions, etc) affect comebacks? How can/has this be quantified before and during a comeback attempt, if so is there a certain threshold that leads to a comeback?
    a. The size of the crowd and home advantage in football: Evidence from Chinese Super League - ScienceDirect

May 31 - June 2 - Existing Studies on Comebacks:

- Does a “comeback” create momentum in overtime? Analysis of NBA tied games - ScienceDirect
    - Collected data from 11 NBA seasons and identified the games that were perceived to be a catalyst for comeback, study aimed to empirically test the concept of psychological momentum in the specific setting of NBA games that are tied at the end of regulation and go into overtime. Authors found no evidence to support this in their analysis.
    - Despite the concept of momentum being frequently discussed in sports, with a common perception that “success breeds success”, the empirical data from this study contradicts that common belief in the context of NBA overtime games.
    - Teams that came from behind to tie the game in regulation did not have a higher chance of winning in the subsequent 5-minute overtime period. This finding held true even for significant comebacks where the tying team trailed by 8 points or more.
    - While comeback momentum was not supported, home teams were found to be more likely to win in overtime, even in games that were tied after regulation. Also,

the general strength of teams (measured by a difference in their total number of wins during the regular season, was a statistically significant factor too.
    - Authors propose many reasons why momentum may not be at play, even though it's so widely perceived - page 6 :
        - Exhaustion, takes a lot of physical effort to get a comeback
        - Tension relief/false accomplishment in the break between regulation and overtime
        - "Could It be that the momentum of the comeback team is offset by higher aggressiveness, focus and motivation of the team that led the game but was robbed from winning by the end of regulation time?"
        - Confirmation Bias: "A possible reason may be that it seems intuitive to expect momentum for the comeback team and therefore people believe that it exists. Furthermore, when one watches a game and its regulation time ends with a tie,if his intuition is that the comeback team will win and he turns out to be correct, maybe being correct in his belief causes him to remember this case more than the other cases when his intuition proved wrong (the comeback team losing in overtime). Such a process can over time reinforce the belief in a momentum of the comeback team."
        - Binomial significance testing, logistic regression (logit model)
- NBA game progression of extreme score shifts and comeback analysis: A team resilience perspective - ScienceDirect
    - "studied NBA games hitting a 20-point deficit during the first half for the 1997/8–2021/2 seasons. Deficits and comebacks were more common in recent seasons. Games reaching the deficit faster were more likely to end in a comeback. Deficits games that tied did not show momentum towards the resurging team." - p 75
    - Anecdotal evidence suggests that players and coaches in the modern NBA era are "not easily rattled" by what were previously considered insurmountable deficits. They exhibit a "collective NBA grit". This "altered psychological approach" allows players to handle pressure situations more calmly and with resolve, recognizing they still have a chance to overcome - p 79 - 80
    - Despite the increasing frequency, successfully overcoming a 20-point deficit remains a rare feat, achieved in only 7% of qualified games (3,942 games studied). - p 75 p 77
    - Games that reached a 20-point deficit earlier in the game (meaning more time remaining) were more likely to result in a comeback. This suggests that a rapid early deficit might not always reflect a true skill difference but rather a "random tilt" or regression to the mean, allowing more time for a "correcting shift" for the losing team. - quote words from p 75
    - This study also reinforces the idea from the last one, that the common belief of a comeback increasing the chances of winning is false since they found games where a team came back from a 20 point deficitht to tie the score did not show a winning momentum towards the resurging team in a later play

    - Posits team resilience (dynamic, psychosocial process which protects a group of individuals from the potential negative effect of the stressors they collectively encounter) as a key psychological construct for understanding comebacks. Team resilience enables a positive adaptation through individual and collective resources when experiencing adversity.
    - A pertinent buffering quality for team resilience is "team learning". This involves team members developing a shared understanding of systems and coordination to withstand pressure and practicing "resetting" the team's focus after challenging situations. For the team that loses a large lead, "cognitive reframing" is needed to focus on the tied score rather than the vanished advantage. - p 80
    - Statistical methods used: correlation, chi-square analysis, one-way ANOVA, two-way ANOVA, pairwise t-tests after ANOVA
- Biased perceptions about momentum: Do comeback teams have higher chances to win in basketball overtimes? | Judgment and Decision Making | Cambridge Core
    - Survey-based experimental study designed to assess perceptions of psychological momentum, in contrast to empirical data, involved presenting hypothetical game scenarios to respondents and asking for their judgments
    - The central finding is a significant discrepancy between the common perception of momentum and the empirical reality, same as the findings from paper 1 (same author), but to build on that it's not only fans who believe it but players and coaches too
    - This belief is strong and statistically significant for moderate (8-point deficit) and extreme (16-point deficit) comebacks. It is weaker or non-existent in minimal comeback scenarios where the score was balanced.
    - Basketball practitioners (players, coaches, referees) were not more accurate in their perceptions than fans; they also held the biased belief in momentum. More familiarity with basketball was actually correlated with stronger belief in comeback momentum, suggesting exposure to media commentary promoting this idea.
    - The way the comeback was framed to survey respondents significantly altered perception: textual descriptions brought the image of the comeback to life - humans love narratives - and strongly elicit momentum based beliefs, score reports led respondents to assign lower chances to the comeback team, and opposite framing (desc. the scenario from the pov of the lost lead team) tended to increase the perceived win probability for the comeback team, though this effect was not always statistically significant.
    - This study will help me in the media analysis of comebacks in the NBA and WNBA, but really offers nothing else in terms of the mental drivers behind a comeback
    - Statistical methods used: ANOVA, Group effect test, mcnemar test, likelihood ratio test, t-tests, logistic regression, descriptive statistics
- Exploring elite soccer teams' performances during different match-status periods of close matches' comebacks - ScienceDirect

    - The study specifically examines comebacks in "close soccer matches" (one-goal difference) across four distinct match-status periods, analyzing how winning and losing teams perform during these phases. Observational data was collected from 17 matches of the Spanish professional soccer league (La Liga) during the 2017-2018 season.
    - Analyzes three main performance indicators minute-by-minute: shots, passing effectiveness (accuracy), and ball possession. These are considered good predictors of team success. Performance metrics, not psychological.
    - The researchers defined four specific periods in a comeback scenario:
        - Period 1: score is 0-0
        - Period 2: One team scores, making it 0-1 or 1-0
        - Period 3: The team that was losing in Period 2 scores to tie the game at 1-1, critical comeback phase
        - Period 4: Team that was losing in Period 2 and ties in Period 3 scores again to win the match 2-1 or 1-2
    - Period 3 (the 1-1 drawing period) was found to be crucial. Statistically significant differences were observed, with winning teams performing better in ball possession and passing effectiveness compared to losing teams in this period
    - Winning teams showed higher values in shots during Period 3 (compared to other periods) and higher passing accuracy in Period 3 (compared to Period 4). They also experienced a decrease in ball possession in Period 4 after scoring the go-ahead goal, which may indicate a decrease in effort after achieving the lead.
    - Losing teams (who failed to complete the comeback) saw a drop in ball possession in Periods 3 and 4 compared to earlier periods, which could be associated with lapses in concentration and the impact of negative momentum after the opponent ties the game
    - Discusses that psychological momentum is perceived to be important, with losing teams trying to overcome adversity by increasing performance after conceding a goal. If they don't score, they can lose motivation, and negative momentum leads to a performance drop. However, if they succeed in scoring (as in Period 3), they turn negative momentum into positive - but momentum has been found to be not statistically significant in other studies, but maybe the perception or illusion of it makes it real enough?
    - Statistical Methods: Hilbert Transform, Frequency Phase Histograms and Phase Attractions, Shapiro Wilk Test, when data did not meet normality assumptions: U test, Friedman Test, Bonferroni post-hoc test, Rank Correlation Test, descriptive stats - many things I had never heard of
- win three set sports
    - Across all three surveyed sports, a consistent game pattern was observed where progressions were "distinctly one-sided", games were unbalanced early on. This pattern remained even with a more granular analysis of Grand Slam tournaments in men's tennis and within round progression.

    - Making a maximal comeback (losing the first two sets and winning three consecutive sets to win the match 3-2) is "extremely difficult and relatively rare" in these three-sets sports, occurring in just below 5% of such matches.
    - The only factor that varied across sports and genders was "the ability to mount a comeback"
        - In women's collegiate volleyball and men's tennis (excluding Davis Cup), the resurging team (after being down 0-2 in sets) was significantly more likely to win the final set
        - No significant differences were found in comeback propensity in the fifth set for men's volleyball, and men's and women's table tennis
        - Earlier research (Weinberg et al., 1983) found men had a greater ability to generate come-from-behind wins in basketball, with NBA home teams trailing by 17 points at halftime winning 8% of the time, while WNBA home teams achieved none
    - Scoring rules make a big difference in how competitive the sport is
    - The authors postulate that "greater crowds may propel a resurgent entity to win" because the comeback narrative generally has a "positive appeal" - example of Jimmy Connors' 1991 comeback
    - References prior NBA comeback research, noting that a 10-point deficit is considered insufficient for a "heroic comeback" in today's faster, 3-point heavy NBA, as it can be erased in merely four possessions. It also reiterates that recent NBA seasons show more 20-point deficits and subsequent comebacks, like the other Goldschmied et al. paper in this doc
    - The study reiterates that while fans perceive come-from-behind efforts to increase winning chances in overtime, empirical tests in the NBA have shown these beliefs "failed to materialize", like Morgulev et al.
    - Also briefly mentions team resilience, like Morgulev et al., but says its an area that has been virtually neglected

Main Takeaways:

- While psychological momentum is perceived by fans, sports players, and coaches, there's no empirical evidence to support it, and there's empirical evidence of bias
- Main mental drivers: Individual resilience, team resilience, team cohesion, mental fortitude/emotional stability, self efficacy, and social/contextual factors
    - Social factors: playing on homebase, verbal persuasion (coaches, fans, teammates), amount of fans watching/in crowd, sporting cultures/media depictions, most of these drivers are hard to quantify without survey data
- Other drivers: team strength throughout the season

What do I want to research: How do the mental and emotional drivers behind major halftime comebacks differ between NBA and WNBA, and how are these comebacks perceived or narrated differently by media and fans? Also open to other sports, just set on doing a gendered comparison of comebacks

- 4 comeback case studies for each division, with media/fan narrative analysis
- Can we look at after game interviews to see what comeback athletes were thinking in game?

Overall Research Goal: How do basketball comebacks and their immediate aftermath differ between the NBA and WNBA, and how does professional sports media portray the psychological factors behind these comebacks?

Timeline:

June 4 - June 5: Psychological Factors Driving Basketball Comebacks (Literature Review)

- Main Goal: Solidify understanding of core psychological concepts and their application in basketball comebacks, drawing from existing sports psychology literature
    - Smaller Goals:
        - Defining basketball comeback
        - Defining core psychological factors of interest
            - Individual Resilience
            - Self-Efficacy
            - Emotional Fortitude/Regulation
        - Defining core social/contextual factors
            - Team Cohesion
            - Collective Efficacy
            - Verbal Persuasion (Coaches/Teammates)
        - Learn about perceived psychological momentum

June 6 - June 21: Empirical Analysis - Comeback Games and Media Narrative Analysis

- Main Goal: Collect sufficient data on relevant comeback games and their media depictions, and begin analysis by the end of the week Summer Research
    - Game Selection:
        - Select 6 NBA and 6 WNBA notable comeback games
            - Start with 2023-2024 seasons (regular and playoffs) and branch backward if you need more examples, which you probably will
            - Selection Criteria: Games where a team overcame a significant deficit after halftime, with the halftime score showing 20+ points behind for NBA and 12+ points behind for WNBA. The teams must successfully overcome this deficit to at least tie the score at any point later in the game. Prioritize games with significant media coverage
    - Quantitative Analysis of Game Data:
        - Data Sources for NBA and WNBA: https://www.basketball-reference.com/
        - Data Collection: Manual for each of the twelve games
            - Steps:
                - 1. Pinpoint the tie: locate the quarter, minutes, and seconds, where the tie took place by looking at the play by play
                - 2. Collect Performance Metrics in the Aftermath (5 minutes after the tie)
                    - Points Scored (by comeback team)
                    - Points Allowed (by comeback team)

            - Field Goal Attempts/Field Goals Made (comeback team)
            - Field Goal Attempts/Field Goals Made (opponent team)
            - Turnovers (comeback team)
            - Turnovers (opponent team)
            - Fouls Committed (comeback team)
            - Fouls Committed (opponent team)
        - Analyses:
            - Calculate basic averages for NBA games vs. WNBA games in the aftermath
            - Try to answer: Do NBA teams, on average, show tendencies in these metrics immediately after a tie compared to WNBA teams?
            - Just looking for observable tendencies and patterns, sample size is too small to look for statistically significant proof of hypotheses
                - Alternatively, I found NBA Play-by-Play Data 2015-2021 | Kaggle, which would give me enough game data to generalize further than the 6 NBA games would. There's not a WNBA data set like this, but I am looking into scraping now to see if it could be feasible.
- Data Collection: Qualitative Media Narrative
    - Data Sources:
        - https://www.espn.com/wnba/
        - https://www.nbcsports.com/wnba
        - https://www.sbnation.com/wnba
        - https://www.espn.com/nba/
        - https://www.nbcsports.com/nba
        - https://bleacherreport.com/nba
    - Data Collection: Manual for each of the twelve games
        - For each chosen game, rapidly scan articles for specific sentences/phrases that describe:
            - Attributions to psychological drivers
            - The "Aftermath" of the tie (language indicating continued momentum vs. mental draining/fatigue, or performance outcomes)
            - Any gendered language/framing
        - Original article URL, headline, and the extracted snippet(s) in your spreadsheet, X marker for yes in desc. of psychological drivers
    - Analyses:

    - Review, categorize, identify dominant themes regarding psychological drivers and the "Aftermath" in NBA vs. WNBA narratives. Compare gendered language

June 22 - June 30: Analysis and Report Writing

- Main Goal: synthesize all collected data, draw conclusions, and write report
    - Qualitative Analysis: cont. goal from last week
    - Quantitative Analysis: Calculate avgs for NBA and WNBA, compare them and look for tendencies and differences in performance immediately after tying the game
    - How do your qualitative insights explain or contrast the quantitative observations?
- Report Writing, to be worked on throughout the next couple weeks and finalized week 4:
    - Introduction
    - Short Literature Review, pull from the notes you took in the last two weeks
    - Methods, clearly explain your qualitative media analysis and your quantitative game data analysis (sources, selection, metrics, comeback parameters, timeframe/possession definition, manual collection). Be clear about the scope.
    - Findings
        - Present your qualitative analysis of how psychological factors and the aftermath are portrayed in NBA vs. WNBA media
        - Present numerical findings for the immediate aftermath using simple tables, discuss the observed tendencies and any initial differences between leagues
    - Discussion
        - How do your qualitative findings align with or diverge from your quantitative observations?
        - Synthesize overall findings regarding psychological drivers and aftermath tendencies
        - Discuss implications related to gender and basketball perception, integrating both qualitative and quantitative observations
    - Limitations and Conclusions
        - Summarize everything
        - Explicitly state the limitations,
            - Mostly in quantitative research, small sample size, limited metrics, manual collection, descriptive stats only