# MIT 15.S50 Lecture 1

**Monday, January 14th, 2013**

MITpokerClass

# Welcome to MIT 15.S50!

- Instructor: **Will Ma**, willma at mit dot edu
- Time: 3:30 – 5:00 PM
- Credits: 3 H units, can be repeated for credit

| Day | Speaker | Location |
|---|---|---|
| Mon, Jan 14th | Will Ma | 10 - 250 |
| Wed, Jan 16th | Will Ma | 10 - 250 |
| Fri, Jan 18th | Bill Chen | 10 - 250 |
| Wed, Jan 23rd | Jennifer Shahade | 32 - 123 |
| Fri, Jan 25th | Matt Hawrilenko | 32 - 123 |
| Mon, Jan 28th | Mike McDonald / Will Ma | E62 - 276 |
| Wed, Jan 30th | Mike McDonald / Will Ma | E62 - 276 |
| Fri, Feb 1st | Charles Nesson | E62 - 276 |

# Syllabus (very rough)

- Poker Concepts: preflop ranges, polarization, bet sizing, implied odds and reverse implied odds, flop texture, credible bluffs, thin value bets, slow-playing, ICM
- Math Concepts: basic combinatorics, probability and expectation, variance and Law of Large Numbers, Nash Equilibrium, statistics in poker
- General Concepts: myths of poker, decisions vs. results, risk management, faults of Nash Equilibrium, current state of real-money poker, poker lifestyle

# Tournaments vs. Cash Games

- The examples in this course will be mostly taken from tournaments, and your homework will be to play tournaments, but really it doesn't matter.
- Good poker is good poker, and the same strategies apply, for the most part, to both tournaments and cash games.
- We choose tournaments over cash games mostly because there is less metagame (opponent selection, bankroll management, etc.)

| Tournaments | Cash Games |
| --- | --- |
| **Fixed buy-in for a certain amount of chips** | Start with any amount of money you want; reload anytime |
| **Play until you lose all your chips** | Start and stop anytime |
| Blinds keep increasing, so eventually you lose all your chips | Fixed blind amount (say $1/$2) |
| **No control over your table** | You choose your table |
| Goal is to survive | Goal is to kill |
| Frequent but fixed losses accompanied by the occasional big win | Big wins, small wins, small losses, big losses can all happen |
| More variance | Less variance |
| Fun? | Work? |
| **Wider range of situations (# of players at table, stack sizes, antes, bubbles)** | Fixed situations |
| Low house rake (premium) | High house rake (premium) |

# Grading: Pass/Fail

- Pass / Fail. I have set up a private home league for MIT 15.S50, on **Pokerstars**. To pass, you need to attend at least 6 out of 8 lectures and accumulate 10 points playing online poker tournaments in the league.
- If you took the class last year, instead of the lecture attendance requirement, you are required to accumulate 20 points while achieving at least 1.00 PPG (points per game) at the end.
- There are no PSets or Exams.

# Currency vs. Points

- You'll notice that all Pokerstars tournaments are described by the monetary buy-in and the monetary payouts, with no mention of points.
- We're only worring about points.
- This is unrealistic?  Yes.  Unfortunately, the Pokerstars software cannot maintain a leaderboard for "who's made the most money" (which makes sense).

Tournament 673215278 Lobby
PokerStars
No Limit Hold'em
Buy-In: 280 + 20
Open for Registration (maximum 45 entrants)
5-table tournament will begin when 45 players have registered.
The buy-in, entry fee, and prizes awarded are in Play Money chips.
PokerStars Tournament 673215278
Tournament Info
Sit & Go
This Sit & Go will begin: once 45 players have registered
Currently registered players: 23
Total prize pool: 12,600.00
7 places paid
1st 4,410.00
2nd 3,150.00
3rd 2,016.00
4th 1,008.00
5th 882.00
6th 630.00
7th 504.00
Table
Players
Largest Stack
Smallest Stack
Player
Chips
Rank
ASL1974 (Germany)
Bushie7 (Australia)
Cadog52 (United Sta...
CaeserVVV57 (Unite...
DavePDef (United St...
de Fonte (Russia)
doninen (United Sta...
dsray (United States)
GoatWar (United Sta...
haune12345 (Germa...
Jb_Silk (Canada)
koljan545 (Russia)
McVee88 (Canada)
miguel an818 (Spain)
O Great One1 (Austr...
pokermom54rv (Unit...
presseclick (Italy)
prostoSweta (Kazakh...
RNscuba (United Sta...
simpleman62 (Unite...
Tyler88157 (Russia)
V.Ivanovna (Russia)
wolfeyes69 (United S...
zeus542011 (Italy)
Register
Player Info
Main Lobby

MIT 15.S50
Club Manager: CutiePi314
Established: November, 2011
Members: 222
Club ID: 557832
Club Home
Schedule
Results
Standings
Options
Manage Games
Manage Club
Club Standings
Real Money
Play Money
Season 1 ( 2012 )
Rename...
Rank
Player
Games
Points
Average
KO
1 AdamT_MIT 89 172.13 1.93 64
2 weileaf 53 119.95 2.26 107.5
3 Md. W. MIT 69 107.53 1.56 99.5
4 Maokai_MIT 58 104.39 1.8 117
5 yongnali 71 102.45 1.44 86.5
6 JohnR_MIT 87 91.92 1.06 106
7 GetWhipped! 67 91.28 1.36 106.5
8 eugenem_MIT 85 90.95 1.07 93.5
9 YutaK_MIT 58 86.05 1.48 43
10 morty2015 81 81.27 1 64.5
11 CalebC_MIT 58 78.46 1.35 53.5
12 ZackS_MIT 64 77.2 1.21 81.5
13 iltack_mit 69 73.12 1.06 66
14 qtdkj 41 72.08 1.76 56.5
15 JungLee_MIT 38 66.22 1.74 67
16 kevinc_mit 36 64.16 1.78 47
17 DavidF_MIT 55 63.88 1.16 60.5
18 jaewonk_MIT 84 62.64 0.75 68.5
19 AndrewJ_MIT 34 59.72 1.76 57.5
20 ARI_O_MIT 76 59.54 0.78 117
21 eric.h_mit 63 56.27 0.89 55
22 JohnK_MIT 54 50.22 0.93 51
23 ahessMIT 56 44.83 0.8 60
24 pandazzzz 68 44.17 0.65 37
* Points are only awarded in tournaments with four or more players.
AdamT_MIT
Cambridge
1
Member since:
January, 2012
Season Statistics ( Play Money )
Total Points: 172.13 ( 1.93 PPG )
Games Played: 89, 2 win(s)
Finishes: Best Place: 1 of 53
Worst Place: 46 of 47
In The Money: 38 out of 89 ( 43% )
[Gold] x 2
[Silver] x 2
[Bronze] x 6
Knockouts: 64
* Tournaments with less than four players do not count towards player statistics.

# Currenty vs. Points [continued]

- If you just tried to maximize your monetary payouts each tournament, this should also maximize your points. Only the top 20% get money while the top 33% get points, but other than that, the two payout curves have the same first and second derivatives.
- Except, you are incentivized to play as many tournaments as possible!
- You can still use your play money balance as an indicator to yourself of how much money you would've made.

# Daily Tournament Schedule (doesn't include specials)

- 6:00 PM - Daily 6-handed
  7:00 PM - Daily Major
  8:00 PM - Daily Turbo
  9:00 PM - Daily Deepstack
  10:00 PM - Daily Shortstack
  11:00 PM - Daily Hyper-turbo
- The Major and Deepstack tournaments will take anywhere between a minute and 3 hours. The other tournaments will take anywhere between a minute and 2 hours. It depends on how long you last and how many players there are.
- The importance of multi-tabling. By single-tabling, you are never increasing your Expected # of Points Earned; only do this for learning, which is important.
- Late registration for 1 hour

# Don't worry…

- I do not wish to fail anyone. If you are far from 10 points in the last week, then you should try to play as many tournaments as possible. If you still do not get 10 points, you must submit a report explaining how you "attempted many tournaments but got unlucky", and I will pass you.

# Eyes on the prize

- Keep playing even after you have 10 points! There will be fantastic prizes for the players with the most points and highest PPG (more TBA):
  - subscriptions to poker training website **Cardrunners**, which I am part of
  - private coaching from Mike McDonald and myself
  - qualify for **MIT Poker Club** tournaments with great prize support!
  - play against the bots of our sister class **MIT Poker Bots** on stage, in their final tournament!
  - poker sets donated by **Susquehanna International Group (SIG)**
  - signed copies of **Jeff Ma**'s books
  - 2 copies of **Jon Tannen's e-book**
  - 3 signed copies of **Verneer**'s **book**
  - a signed copy of **Jared Tendler**'s **book**

# Social Experience

- You can click "Standings" in Pokerstars to see how you are doing.
- I hope that this casually competitive league is an enjoyable social experience for the whole class.
- I hope no one is uncomfortable about their results being public.
- I hope you end up meeting your online opponents in real life.
- This is why I will make sure to ask for people's names in class!  So that you can find them the next day and say, "Wow you make a sick bluff against me!"

# Course homepage and Mailing list

- Please join the mailing list!
- Do so at the course homepage:
- http://web.mit.edu/willma/www/mit15s50.html
- All announcements will be sent on the mailing list and then posted to the homepage. Course materials will be posted to the homepage.
- **Missing classes**: not only are we tracking attendance, each class greatly builds on previous classes. I will try to upload the recorded lecture right away; if not, try your best reading from the Powerpoint slides. If you don't understand something, ask your friends / email me.

# Listener?

- I encourage you to register for the class (no extra work if you were already going to play anyway).
- If you are NOT registered for the class (or have dropped the class) but DO play in the online league, please send me an email explaining your situation

# Attendance Tracking

- Aguilar – Fitzcheung: Chris
- Fu – Lee : Hellen
- Li – Shoyombo : Eric
- Shrestha – Zhao : Swati

- YOU are responsible for finding your person!

# Start playing right away!

- No penalty / shame for playing a tournament and busting right away
- Difficult to relate to lecture material if you never play poker yourself, and you'll quickly fall behind
- Fall behind socially
- Give yourself a shot to win prizes!

# Sign up for the Live Tournament!

- We are in for a treat this year as the MIT Poker Club is organizing a live tournament for us!
- Sign-up link https://docs.google.com/spreadsheet/viewform?formkey=dGpvUXllNXBTd2VKMEthei0tTzNkYmc6MQ
- You will get points for this class as well (amount TBA), but these will NOT contribute for prizes (only for passing) as this tournament has its own prizes

MITpokerClass and POKER CLUB

SIG SUSQUEHANNA and POKER CLUB

PRESENT

# 2013 IAP POKER QUALIFIER TOURNAMENT

*No Entry Fee*

*Earn Points for Poker Class*

*Qualify for MIT Series of Poker Main Event*

Thursday January 17th 1pm

Baker Dining H

Drop your resumé online

http://poker.scripts.mit.edu/resume.htm

# 2013 MIT SERIES OF POKER MAIN EVENT

(Invite Only*)

Featuring

Bill Chen

*Two time World Series of Poker Champion*

1st Place: iPad
2nd Place: Xbox + Kinect
3rd Place: Kindle Fire
4th Place: SIG Poker Set
5th - 10th Place:
Signed copy of The Mathematics of Poker

Refreshments and Dinner provided

Saturday January 19th 1pm

Baker Dining Hall

Bring your resumé

*Invitation through Qualifier tournament on January 17th

# Pre-flop Play

- First two classes we are going to spend a lot of time on pre-flop play.
- It is “boring”, and “never analyzed by the pros” (because all the pros know it too well)
- A lot of it involves a binary “all-in” or “fold” decision
- Memorizing some simple rules will greatly improve your poker EV (compared to postflop play, where you spend a year studying and improve your EV by a tiny amount)
- Compare it with running laps in soccer practise, instead of practising fancy bicycle kicks
- Compare it with learning end games in chess, instead of learning openings

# The Importance of Blinds

- The game revolves around the blinds. The motivation of every hand is to steal the money that was forced into the pot. Without the blinds, there is no game.
- You would always fold KK preflop if there were no blinds.
- Your stack size is always measured relative to the blinds. Having $400 in front of you in a game where the blinds are $1/$2 is, for our purposes, completely equivalent to having $4000 in front of you in a $10/$20 game.
- In both situations above, we say that you have “200 bets”, or “200 big blinds”, or “200BB”.

# So you want the blinds…

- If no one has raised yet, DO NOT CALL. RAISE to give yourself a chance of winning the blinds for free preflop.
- Although this rule will eventually have exceptions, this is definitely beginner mistake #1.
- The minimum raise is raising to 2BB. However, this is usually too small. You give the blinds the odds to have a profitable call. And when they have a profitable move, that money is coming from YOU.
- On the other hand, if you raise too big (say all-in), you are risking more than necessary to make your steal.
- You want to hit the "sweet spot" between the minimum-raise of 2BB and "all-in".

# Rule of Thumb (for now)

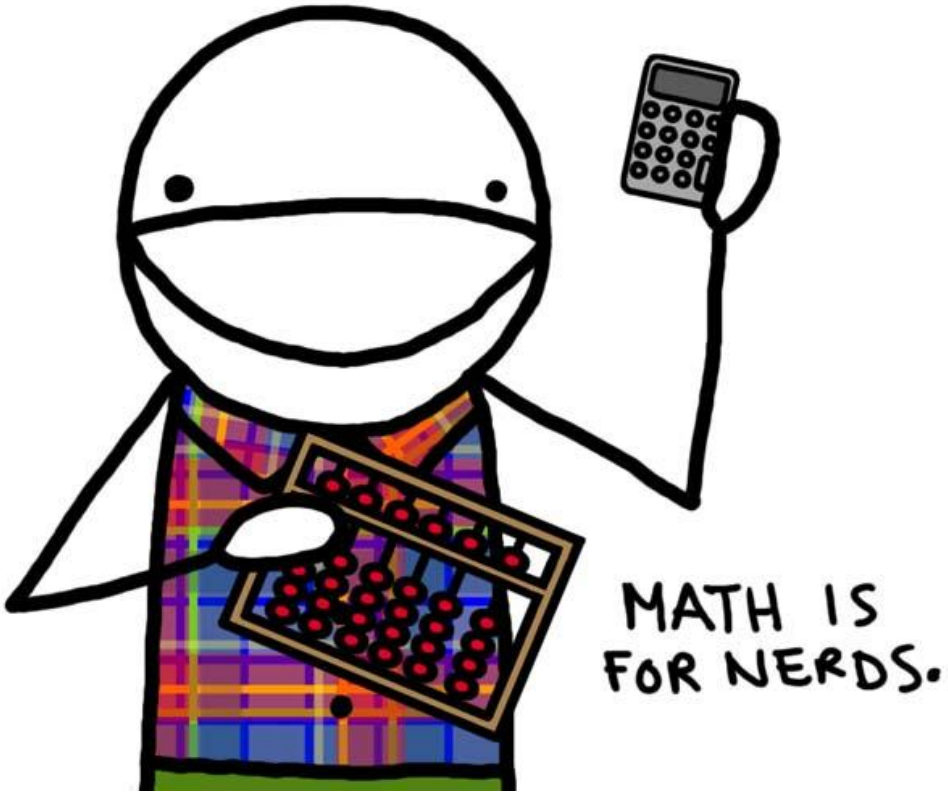
- As long as you have more than 15BB, raise to 2.25BB when you want to raise. (Manually calculate and type in the number.)
- Early on in tournaments (first 2 levels), out of laziness, it is customary to raise to 3BB instead of 2.25BB.
- If you have less than 15BB, just go all-in instead of raising to 2.25BB.
- Being afraid to go all-in, especially once you've made it far in a tournament, is beginner mistake #2.
- "In order to live, you must be willing to die." True on the battlefield, true at a poker table.

# Effective Stack Size

- "*As long as you have more than 15BB*, raise to 2.25BB when you want to raise. Otherwise, go all-in when you want to raise."

- The italicized sentence should be replaced by "*as long as the effective stack size is more than 15BB*". The Effective Stack Size is the maximum # of BB's you could be playing for, given the players that haven't folded yet. It is never more than how many BB's you have, but it can be considerably less if you are the big stack.

# If you like math definitions…




- Effective Stack Size :=
- Min{ your stack size, Max {stack sizes of players who haven't yet folded} }

# Names of Positions

# Names of Positions in 6-max

# Key to Naming Positions

- The key to naming positions is being clear how far away you are from the Button, or how many players behind you are left to act.
- UTG (Under-the-Gun) refers to the player to the left of the Big Blind, and is technically the same as Lojack in a 6-handed table … but it is much better to say Lojack since you know it is 3 from the Button. Alternatively, say "UTG at 6-handed table".
- If everyone folds to you and you are Cutoff, you don't even need to specify how many players were at the table, for the purposes of hand analysis.

# Positions and Acronyms

- UTG "Under-the-gun" (7 players left)
- UTG+1 (6 players left)
- UTG+2 (5 players left)
- LJ "Lojack" (4 players left)
- HJ "Hijack" (3 players left)
- CO "Cutoff" (2 players left)
- BU or BTN "Button"
- SB "Small Blind"
- BB "Big Blind" – Don't get confused with saying "He has 12BB". It is a valid sentence to say "The BB has 12BB."

# Calculating Effective Stack Size

- Going all-in here is reasonable even though we have 21BB, since we are only wagering up to 12.5BB (the Big Blind's stack size).
- Sure, we could have wagered our entire 21BB vs. UTG+1 or UTG+2 making it too much to all-in, but UTG+1 and UTG+2 have already folded.

# Calculating Effective Stack Size 2

- Even though Lojack has 16BB's, his all-in is acceptable, since he is only wagering more than 15BB's against one person (the Button).
- However, I would still say his Effective Stack Size is 16BB.

# Cards and Position

- Okay, so now I know that I'm supposed to raise preflop and steal the blinds, and I know how big to size my bet in all situations.
- But the most important factor has to be my cards, right?
- Yes!  But how good your cards are is only **relative to your position**.  99 in early position is much worse than 55 as the dealer.

# Tightish Range to Open from UTG at 9-handed table (7 players left)

# Note how tight this is!

- Almost all beginners make the mistake of playing too many hands, especially from early position.
- Remember, only the best out of 9 hands wins the pot. When there's 9 hands, that hand will be very good! Second best gets nothing. So don't play a hand unless you think it can be the best of 9 hands.
- And when you do get a good hand, don't be afraid to continue betting and raising, aiming to get all your money in by the river.

# Hands to add for UTG+1 (6 players left)

# UTG+2 (5 PLAYERS LEFT)

# But wait a second! What if I have a good hand but UTG or UTG+1 didn't fold!?

# Understanding Equity

- The probability that you win the pot at showdown, assuming no player folds.
- It's an expectation over two (mostly independent) probability distributions:
  - your opponent's hand, to which you assign a distribution (and Bayesian update it as the action unfolds)
  - the cards yet to come on the table
- Pokerstove is a very nice software to calculate this!
- Download at www.pokerstove.com. Pretty self-explanatory to use; email me or ask friends if you have issues.

# Remember the situation…

# How much equity do we need?

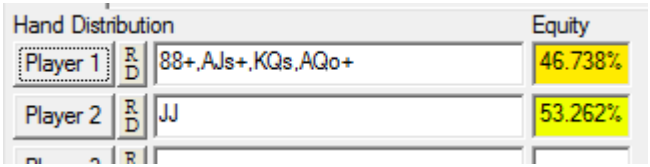
- From any non-blind position, we need to put 120 after which the pot would be 300 = 40%.
- From the small blind, we need to put in 100 after which the pot would be 280 = 36%.
- From the big blind, we need to put in 80 after which the pot would be 260 = 31%.

- However, this equity calculation is not an accurate reflection of our value in calling at all. It's just a starting spot.
- The equity calculation is exactly accurate when we are debating an all-in.

# And our opponent's range…

# Considering your equity

- Wow, 53%, more than 50% against his range!



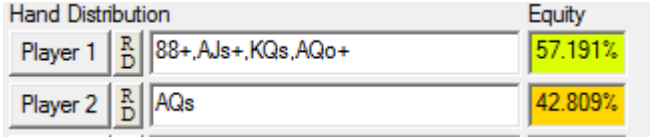

- We definitely have the necessary equity to call. In fact, we should be raising, since it is in our favor is money is put in 1-to-1!
- But raising is not obviously the right play, since he could fold his worse hands and only call his better hands…

# Many Extraneous Factors

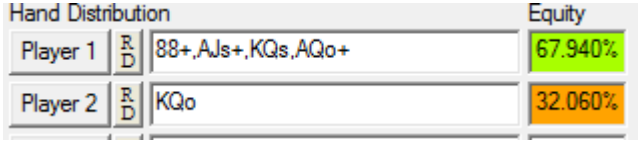
- It's not like we are all-in when we call their raise. A lot more money could go in on the Flop, Turn, and River. Whether we could put this money in well plays a huge role in whether it's profitable to call. We are in position postflop, so in general, we can assume we can make better decisions than our opponent postflop about whether to put money in.
- Maybe our equity is terrible, but we could get in lots of good bluff spots that are likely to get a fold.
- There are many players behind who could also call, significantly changing our equity, and also having position on us. Even worse, they could re-raise!

# Considering your equity [continued]

- Suppose we had AQs instead:




- By the calculation from a few slides ago, it suggested we need 40.3% equity, which we do have, so probably we can at least call.
- Suppose we had KQo instead:

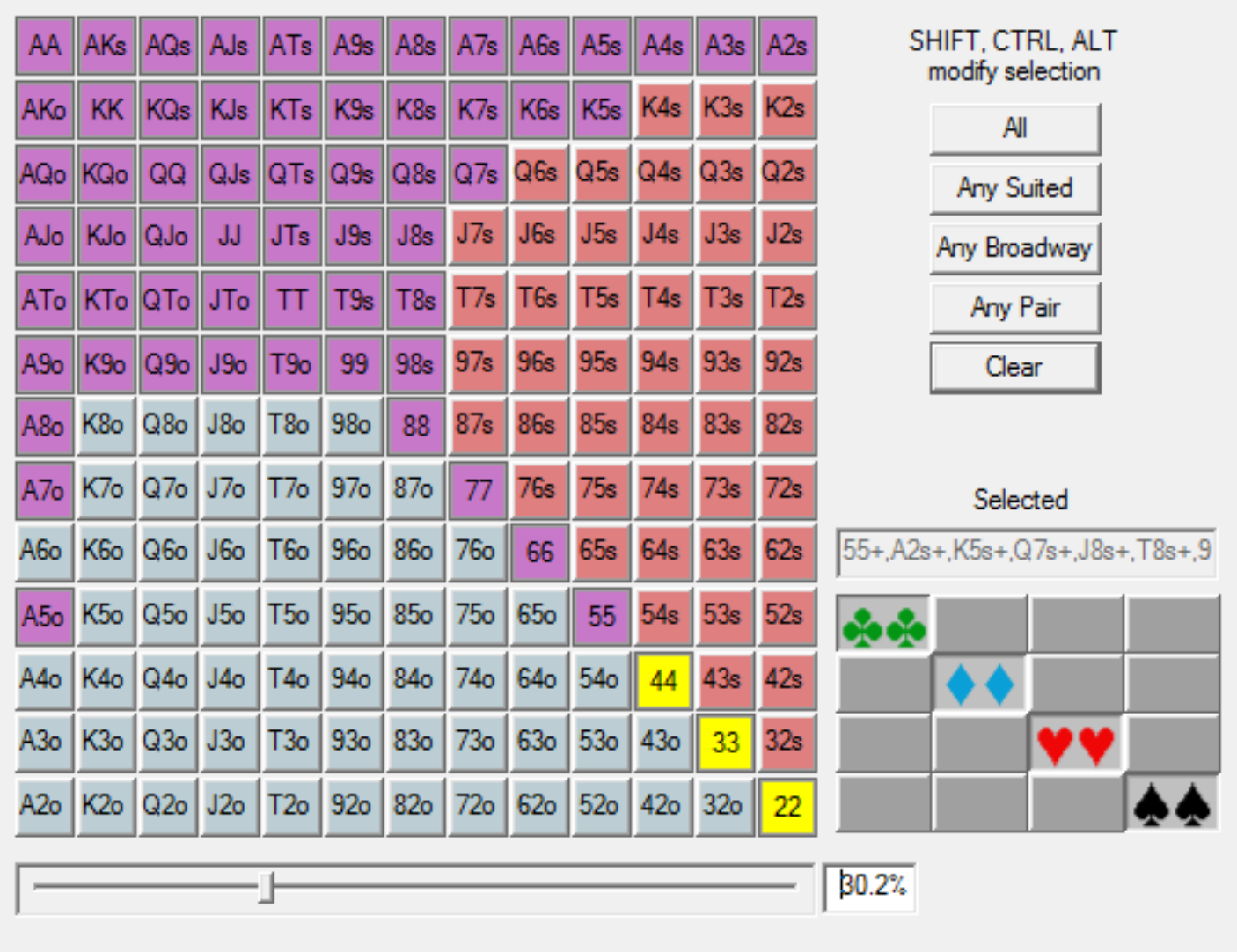



- Note that we have nowhere near the 40.3% equity required, we probably can't call.
- However, in both cases, it's possible that raising is +EV. And in the case of AQs, it's possible raising is MORE +EV than calling.

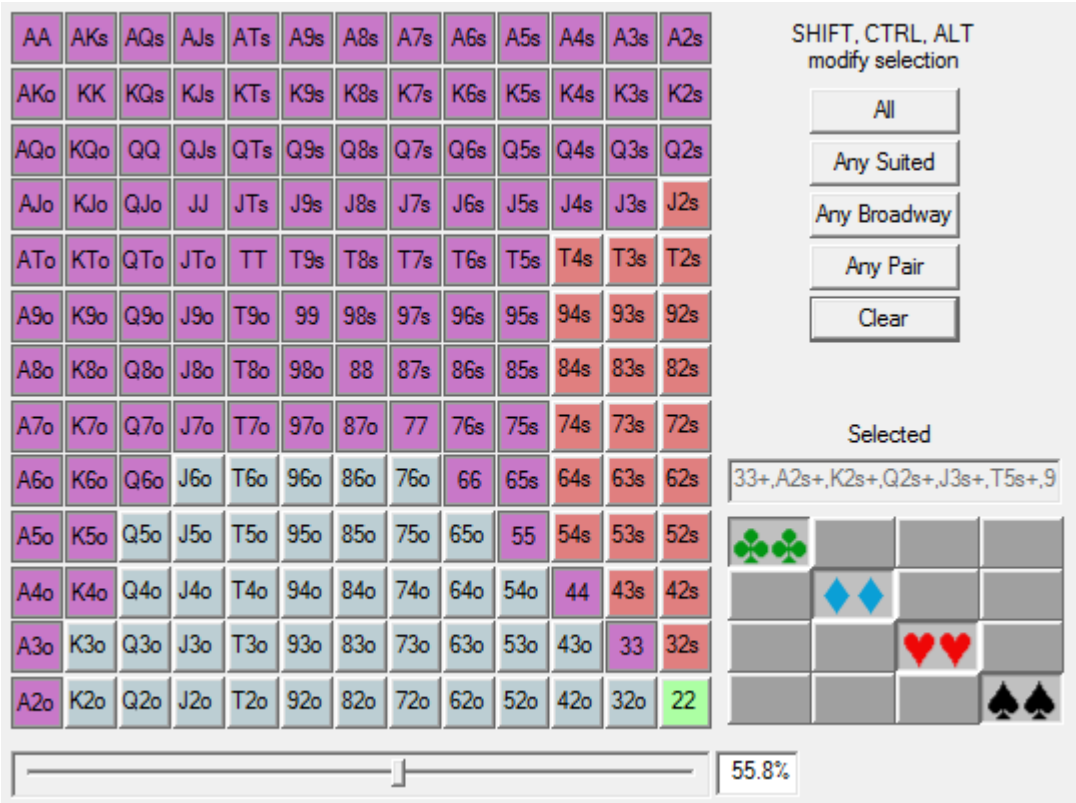
# Back to opening ranges…4 to button

# Hijack (3 to button)

# Cutoff (2 to button) : approx 30%



# Button (1 to button): Approx 55%



# Small blind

- Let's compare opening from the small blind to opening from the button.
- Opening from the small blind, you have to get through one fewer person
- You also have to wager less to raise, since half a bet has automatically been put in already.
- However, you are out of position.
- All in all, these factors balance out and you can open the same range from the small blind as you would from the button.
- The fact that you are out of position hurts less and less as stacks get shallower.

# All-ins

- However, the % of hands you can all-in from the Small Blind is vastly different than the % of hands you can all-in from the Button, when you have less than 15BB.
- In fact, when it's folded to you in the Small Blind, it can often be a good strategy to shove as much as 20BB, just to avoid playing out of position.

# Antes

- An extra small bet that EACH player must put into the pot EACH hand; these sum to around a big blind
- Come in during the later stages of a tournament; inexistent in cash games
- This gives you SO much more incentive to try to steal the blinds, since now essentially EVERYONE posted a blind
- Don't think of antes in the pot as just "the blinds are bigger", since you don't have to raise (and risk) any bigger to steal the blinds

# What antes look like…

# Preflop All-ins

- Assume that there are antes now!
- This is reasonable since usually all-in situations only arise in the later stages of tournaments, by which antes have come in
- When you are at 15BB, go all-in with exactly the set of hands you would open (this is not a good approximation, but it will have to do for now).
- As your stack gets smaller, you increase the % of hands with which you go all-in…but the increase is slow until you get as low as the 5BB area…we will look at this more in a future lecture.

# Some preflop numbers to memorize

- Bigger pair vs. smaller pair: **80/20**
  - AA vs KK: 81.9%
  - AA vs 88: 80.5%
  - 33 vs 22: 80.4%
- A pair vs. zero overcards: **80/20**
  - AA vs AKo: 93.2%
  - AA vs 65s: 77.5%
  - JJ vs T9s: 81.7%
  - QQ vs 74o: 84.8%

# Some preflop numbers to memorize

- A pair vs. one overcard: **70/30**
  - QQ vs AJo: 71.7%
  - QQ vs AJs: 68%
  - QQ vs AQs: 65.7%
  - 88 vs A2o: 70.2%
  - 33 vs A2o: 68.8%
- "Dominating" the other person: **70/30**
  - AKo vs AQs: 70.1%
  - AKs vs AQo: 75.4%
  - AKo vs AQo: 74.4%
  - AKo vs KQo: 74.8%
  - AJo vs A2o: 72.6%
  - A8o vs A2o: 65.7%
  - A5o vs A2o: 56.2%

# Some preflop numbers to memorize

- Two overcards vs. a pair: **50/50**
  - AKs vs 22: 49.9%
  - AKo vs 22: 47.4%
  - AKo vs QQ: 43%
  - T9s vs 22: 54%

# A>B>C>D

- AB vs CD: **60/40**
  - AKs vs 76s: 61.1%
  - AKo vs Q7o: 67.7%
- AC vs BD: **60/40**
  - AQo vs K9s: 60.1%
  - K7o vs J3o: 63.7%
- AD vs BC: **60/40**
  - A2o vs K3o: 61.4%
  - A2o vs T9s: 51.6%
  - AJs vs KQs: 59%

# The importance of suitedness

- Remember some numbers:
  - AKo vs AQs: 70.1%
  - AKs vs AQo: 75.4%
  - AKo vs AQo: 74.4%
- Suitedness changes your equity so much when you're behind! Whereas it changes your equity much less when you're ahead.
- When you're the one going all-in, you will usually be behind when called. Thus, suitedness matters so much, because it gives you additional ways to catch up and pull ahead.
- When you're the one calling, you'll usually already be ahead, so suitedness matters less.
- (Suitedness also matters a lot for postflop play. So it only doesn't matter much when you're calling a preflop all-in with a hand that is likely to be ahead.)

# UTG All-Ins (approximated for pedagogical reasons)

- 15BB: 6.2%

| | | | | | | |
|---|---|---|---|---|---|---|
| AA | AKs | AQs | AJs | ATs | A9s | A8s |
| AKo | KK | KQs | KJs | KTs | K9s | K8s |
| AQo | KQo | QQ | QJs | QTs | Q9s | Q8s |
| AJo | KJo | QJo | JJ | JTs | J9s | J8s |
| ATo | KTo | QTo | JTo | TT | T9s | T8s |
| A9o | K9o | Q9o | J9o | T9o | 99 | 98s |
| A8o | K8o | Q8o | J8o | T8o | 98o | 88 |

10BB: 13.4%

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| AA | AKs | AQs | AJs | ATs | A9s | A8s | A7s | A6s | A5s |
| AKo | KK | KQs | KJs | KTs | K9s | K8s | K7s | K6s | K5s |
| AQo | KQo | QQ | QJs | QTs | Q9s | Q8s | Q7s | Q6s | Q5s |
| AJo | KJo | QJo | JJ | JTs | J9s | J8s | J7s | J6s | J5s |
| ATo | KTo | QTo | JTo | TT | T9s | T8s | T7s | T6s | T5s |
| A9o | K9o | Q9o | J9o | T9o | 99 | 98s | 97s | 96s | 95s |
| A8o | K8o | Q8o | J8o | T8o | 98o | 88 | 87s | 86s | 85s |
| A7o | K7o | Q7o | J7o | T7o | 97o | 87o | 77 | 76s | 75s |
| A6o | K6o | Q6o | J6o | T6o | 96o | 86o | 76o | 66 | 65s |
| A5o | K5o | Q5o | J5o | T5o | 95o | 85o | 75o | 65o | 55 |

5BB: 33.3%

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AA | AKs | AQs | AJs | ATs | A9s | A8s | A7s | A6s | A5s | A4s | A3s | A2s |
| AKo | KK | KQs | KJs | KTs | K9s | K8s | K7s | K6s | K5s | K4s | K3s | K2s |
| AQo | KQo | QQ | QJs | QTs | Q9s | Q8s | Q7s | Q6s | Q5s | Q4s | Q3s | Q2s |
| AJo | KJo | QJo | JJ | JTs | J9s | J8s | J7s | J6s | J5s | J4s | J3s | J2s |
| ATo | KTo | QTo | JTo | TT | T9s | T8s | T7s | T6s | T5s | T4s | T3s | T2s |
| A9o | K9o | Q9o | J9o | T9o | 99 | 98s | 97s | 96s | 95s | 94s | 93s | 92s |
| A8o | K8o | Q8o | J8o | T8o | 98o | 88 | 87s | 86s | 85s | 84s | 83s | 82s |
| A7o | K7o | Q7o | J7o | T7o | 97o | 87o | 77 | 76s | 75s | 74s | 73s | 72s |
| A6o | K6o | Q6o | J6o | T6o | 96o | 86o | 76o | 66 | 65s | 64s | 63s | 62s |
| A5o | K5o | Q5o | J5o | T5o | 95o | 85o | 75o | 65o | 55 | 54s | 53s | 52s |
| A4o | K4o | Q4o | J4o | T4o | 94o | 84o | 74o | 64o | 54o | 44 | 43s | 42s |
| A3o | K3o | Q3o | J3o | T3o | 93o | 83o | 73o | 63o | 53o | 43o | 33 | 32s |
| A2o | K2o | Q2o | J2o | T2o | 92o | 82o | 72o | 62o | 52o | 42o | 32o | 22 |

# Another example of extrapolation: HJ

- 15BB: 23.4%

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AA | AKs | AQs | AJs | ATs | A9s | A8s | A7s | A6s | A5s | A4s | A3s | A2s |
| AKo | KK | KQs | KJs | KTs | K9s | K8s | K7s | K6s | K5s | K4s | K3s | K2s |
| AQo | KQo | QQ | QJs | QTs | Q9s | Q8s | Q7s | Q6s | Q5s | Q4s | Q3s | Q2s |
| AJo | KJo | QJo | JJ | JTs | J9s | J8s | J7s | J6s | J5s | J4s | J3s | J2s |
| ATo | KTo | QTo | JTo | TT | T9s | T8s | T7s | T6s | T5s | T4s | T3s | T2s |
| A9o | K9o | Q9o | J9o | T9o | 99 | 98s | 97s | 96s | 95s | 94s | 93s | 92s |
| A8o | K8o | Q8o | J8o | T8o | 98o | 88 | 87s | 86s | 85s | 84s | 83s | 82s |
| A7o | K7o | Q7o | J7o | T7o | 97o | 87o | 77 | 76s | 75s | 74s | 73s | 72s |
| A6o | K6o | Q6o | J6o | T6o | 96o | 86o | 76o | 66 | 65s | 64s | 63s | 62s |
| A5o | K5o | Q5o | J5o | T5o | 95o | 85o | 75o | 65o | 55 | 54s | 53s | 52s |
| A4o | K4o | Q4o | J4o | T4o | 94o | 84o | 74o | 64o | 54o | 44 | 43s | 42s |
| A3o | K3o | Q3o | J3o | T3o | 93o | 83o | 73o | 63o | 53o | 43o | 33 | 32s |
| A2o | K2o | Q2o | J2o | T2o | 92o | 82o | 72o | 62o | 52o | 42o | 32o | 22 |

- 10BB: 28%

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AA | AKs | AQs | AJs | ATs | A9s | A8s | A7s | A6s | A5s | A4s | A3s | A2s |
| AKo | KK | KQs | KJs | KTs | K9s | K8s | K7s | K6s | K5s | K4s | K3s | K2s |
| AQo | KQo | QQ | QJs | QTs | Q9s | Q8s | Q7s | Q6s | Q5s | Q4s | Q3s | Q2s |
| AJo | KJo | QJo | JJ | JTs | J9s | J8s | J7s | J6s | J5s | J4s | J3s | J2s |
| ATo | KTo | QTo | JTo | TT | T9s | T8s | T7s | T6s | T5s | T4s | T3s | T2s |
| A9o | K9o | Q9o | J9o | T9o | 99 | 98s | 97s | 96s | 95s | 94s | 93s | 92s |
| A8o | K8o | Q8o | J8o | T8o | 98o | 88 | 87s | 86s | 85s | 84s | 83s | 82s |
| A7o | K7o | Q7o | J7o | T7o | 97o | 87o | 77 | 76s | 75s | 74s | 73s | 72s |
| A6o | K6o | Q6o | J6o | T6o | 96o | 86o | 76o | 66 | 65s | 64s | 63s | 62s |
| A5o | K5o | Q5o | J5o | T5o | 95o | 85o | 75o | 65o | 55 | 54s | 53s | 52s |
| A4o | K4o | Q4o | J4o | T4o | 94o | 84o | 74o | 64o | 54o | 44 | 43s | 42s |
| A3o | K3o | Q3o | J3o | T3o | 93o | 83o | 73o | 63o | 53o | 43o | 33 | 32s |
| A2o | K2o | Q2o | J2o | T2o | 92o | 82o | 72o | 62o | 52o | 42o | 32o | 22 |

- 5BB: 50.4%

# Small Blind All-in Percentage

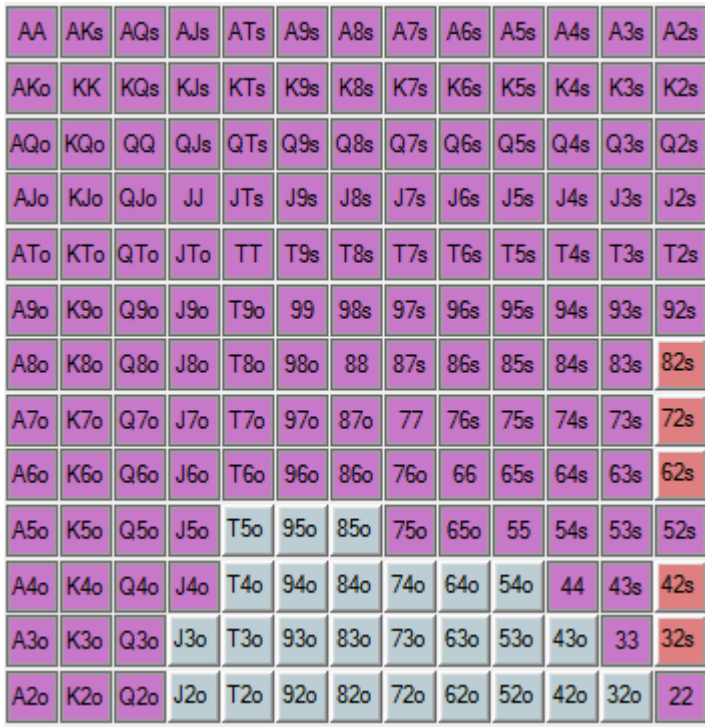
- Recall that we said your button opening range should be similar to your small blind opening range.
- However, since the “out of position” disadvantage of the small blind is gone, you can shove MUCH more from the small blind than you can from the button. You have to go through HALF as many people! So you can shove “twice” as large a % of hands (not really).

# 15BB's from BTN vs SB

- 15BB's from BTN:
- 55% (we know this)

| AA | AKs | AQs | AJs | ATs | A9s | A8s | A7s | A6s | A5s | A4s | A3s | A2s |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AKo | KK | KQs | KJs | KTs | K9s | K8s | K7s | K6s | K5s | K4s | K3s | K2s |
| AQo | KQo | QQ | QJs | QTs | Q9s | Q8s | Q7s | Q6s | Q5s | Q4s | Q3s | Q2s |
| AJo | KJo | QJo | JJ | JTs | J9s | J8s | J7s | J6s | J5s | J4s | J3s | J2s |
| ATo | KTo | QTo | JTo | TT | T9s | T8s | T7s | T6s | T5s | T4s | T3s | T2s |
| A9o | K9o | Q9o | J9o | T9o | 99 | 98s | 97s | 96s | 95s | 94s | 93s | 92s |
| A8o | K8o | Q8o | J8o | T8o | 98o | 88 | 87s | 86s | 85s | 84s | 83s | 82s |
| A7o | K7o | Q7o | J7o | T7o | 97o | 87o | 77 | 76s | 75s | 74s | 73s | 72s |
| A6o | K6o | Q6o | J6o | T6o | 96o | 86o | 76o | 66 | 65s | 64s | 63s | 62s |
| A5o | K5o | Q5o | J5o | T5o | 95o | 85o | 75o | 65o | 55 | 54s | 53s | 52s |
| A4o | K4o | Q4o | J4o | T4o | 94o | 84o | 74o | 64o | 54o | 44 | 43s | 42s |
| A3o | K3o | Q3o | J3o | T3o | 93o | 83o | 73o | 63o | 53o | 43o | 33 | 32s |
| A2o | K2o | Q2o | J2o | T2o | 92o | 82o | 72o | 62o | 52o | 42o | 32o | 22 |

- 15BB's from SB:
- 75%



| AA | AKs | AQs | AJs | ATs | A9s | A8s | A7s | A6s | A5s | A4s | A3s | A2s |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AKo | KK | KQs | KJs | KTs | K9s | K8s | K7s | K6s | K5s | K4s | K3s | K2s |
| AQo | KQo | QQ | QJs | QTs | Q9s | Q8s | Q7s | Q6s | Q5s | Q4s | Q3s | Q2s |
| AJo | KJo | QJo | JJ | JTs | J9s | J8s | J7s | J6s | J5s | J4s | J3s | J2s |
| ATo | KTo | QTo | JTo | TT | T9s | T8s | T7s | T6s | T5s | T4s | T3s | T2s |
| A9o | K9o | Q9o | J9o | T9o | 99 | 98s | 97s | 96s | 95s | 94s | 93s | 92s |
| A8o | K8o | Q8o | J8o | T8o | 98o | 88 | 87s | 86s | 85s | 84s | 83s | 82s |
| A7o | K7o | Q7o | J7o | T7o | 97o | 87o | 77 | 76s | 75s | 74s | 73s | 72s |
| A6o | K6o | Q6o | J6o | T6o | 96o | 86o | 76o | 66 | 65s | 64s | 63s | 62s |
| A5o | K5o | Q5o | J5o | T5o | 95o | 85o | 75o | 65o | 55 | 54s | 53s | 52s |
| A4o | K4o | Q4o | J4o | T4o | 94o | 84o | 74o | 64o | 54o | 44 | 43s | 42s |
| A3o | K3o | Q3o | J3o | T3o | 93o | 83o | 73o | 63o | 53o | 43o | 33 | 32s |
| A2o | K2o | Q2o | J2o | T2o | 92o | 82o | 72o | 62o | 52o | 42o | 32o | 22 |

# Summary of Beginner Preflop Mistakes

- Leaking a small amount of money on a large number of hands
- Instead of only playing a small number of hands, and wagering ALL their money on those hands

# Too much of this…

# And this…

LEAVE TABLE
VIEW LOBBY
UTG+1
$6300
HJ-2
$7900
UTG
$7900
HJ-1
$7900
$1600
$800
$900
BB
$7100
HJ
$7900
$400
SB
$7500
CO
$7900
BTN
$7900
Chat
Notes
Stats
Info
Last Action
UTG+1 raises to 1600$

# Not enough of this…

# And this…

LEAVE TABLE
VIEW LOBBY
UTG+1
$7900
HJ-2
$7900
UTG
$7900
HJ-1
$7900
$800
$900
BB
$7100
HJ
$7900
$400
SB
$7500
CO
$7900
BTN
$7900
Chat
Notes
Stats
Info
Last Action
UTG+1 folds

# WHY IS THIS SO BAD

# But THIS okay?

# When you get caught in the first case, there is no escape anyway

# Analysis

- Need to call ~8BB to win a total pot of ~22.5BB (10+10+1+0.5+1)
- Only need 36% equity
- You definitely have this with ATcc, so you're basically committed
- Your equity against 66+,AJ+,KQ is 39% (Pokerstove)

# The point?

- Recall the "Sweet Spot" Theory:
  - The reason for raising small is to ESCAPE when you have a bad hand. ATs is definitely a "bad hand" in your range: in fact, it's the worst hand in your range of 77+,ATs+,AJo+,KQ.
  - The reason for raising big is to disallow the Blinds to have such good odds to call and defend against you stealing.
- But we just proved that you CANNOT ESCAPE anyway!
- So you might as well raise AS BIG AS POSSIBLE ie. all-in.
- Sure, you can raise to 4BB (out of your 10BB) to deny your opponent good odds, but this is still worse than just going all-in (although mostly equivalent).

# The second case…

# Analysis

- Need to call ~ 17BB to win a total pot of ~ 40.5BB (19+19+1+0.5+1)
- Need 42% equity
- You definitely don't have this, so you can "escape" and fold

# Re-raise Sizing

- Same principles apply:
  - Advantage of re-raising to a small size: risk less when you intend to fold your hand to a re-re-raise.
  - Advantage of re-raising to a large size: deny your opponent the odds to call profitably.
  - If your re-raise size would cause you to commit over a "critical portion" of your stack such that you cannot escape, then just re-raise all-in instead.

# This is disastrous! He needs to call 1.5BB to win 9BB (2.5+4+1+0.5+1). You're giving him 6-to-1 odds!

# He needs to call 3000 to win 9100 (2000+5000+800+400+900). 3-to-1 odds, much less ludicrous!

# Changes in "critical portion"

- This "critical portion" gets smaller as ranges get stronger:
  - I told you to go all-in when you have 15BB or less. Essentially what I'm saying is, "commiting 2BB of your 15BB in a min-raise is already a critical portion" (13%).
  - If you are re-raising pre-flop, I'd say you need to commit 25% before it's critical.
  - So in the previous hand, if you had 20000 chips or less, I'd just go all-in instead.

LEAVE TABLE
VIEW LOBBY
UTG+1
$17900
All In
UTG
$19900
HJ-1
$19900
$2000
$19900
$800
$900
BB
$19100
HJ
$19900
$400
SB
$19500
CO
$19900
BTN
$19900
Chat
Notes
Stats
Info
Last Action
HJ-2 is All-in

# Postflop bet sizing

- The same principles apply…
  - Make sure you don't bet too small a fraction of the pot such that your opponent can profitably continue with a wide range.
  - If you bet too large, you are risking more when you get raised.
- All the ratios are significantly less…
  - Often, you can give your opponent 6-to-1, and they will fold (on flops like A82 rainbow, although likely not on flops like T98 twotone, 532 monotone)
  - Often, you can bet half your remaining stack on the river and fold to a raise.
- This makes sense, because as more cards come out, the equity of bad hands approach 0% while the equity of good hands approach 100%.

# Another tip crucial for postflop play… Remember the purpose of a bet!

- The purpose of a bet is either
  - To get your opponent to call with a worse hand ("value-bet")
  - Or to get your opponent to fold a better hand ("bluff")
- If your bet accomplishes neither of these purposes, don't bet!
- Often you think you are very likely to have the best hand, but know you'll only be called by better hands – so don't bet!

# Why is calling a preflop raise okay?

- Recall that I said you should never just call preflop, if the pot hasn't been raised yet.
- But, if the post HAS been raised, like in the previous example, then just calling is okay.
- Why is this?
- The big blind can put in another raise preflop when he has a good hand, even if you limp.
- The first preflop raiser does NOT get to put in another raise preflop if you don't re-raise him.
- While limping has NO advantages, calling a preflop raise has SOME advantages. So it is sometimes a viable option.

# In position with a hand that plays well in a multiway pot…it's all good

# Disaster!

LEAVE TABLE
VIEW LOBBY
UTG+1
$8000
HJ-2
$8000
UTG
$8000
HJ-1
$6700
$1300
$50
$150
BB
$7950
HJ
$7850
$25
$150
SB
$7975
CO
$7850
BTN
$7400
Chat
Notes
Stats
Info
Last Action
CO folds

# How to deal with callers?

- Even though I've explained why you should never be just calling when the pot has not been raised, people will inevitably still make this mistake.
- We call such people "limpers", usually a derogatory term.
- Either way, you need to be prepared to punish such people and raise their limps.
- But, you need to be aware that you should change your raise size.
- Be wary of the limp-raise.

# If you follow the "raise to 3BB" rule, you're giving the limpers too good a price to call!

# Not just 3BB…3BB+1BB for each limper = 6BB

# Calling all-ins

# Analysis with A8cc

- Opponent shoving 23%:

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AA | AKs | AQs | AJs | ATs | A9s | A8s | A7s | A6s | A5s | A4s | A3s | A2s |
| AKo | KK | KQs | KJs | KTs | K9s | K8s | K7s | K6s | K5s | K4s | K3s | K2s |
| AQo | KQo | QQ | QJs | QTs | Q9s | Q8s | Q7s | Q6s | Q5s | Q4s | Q3s | Q2s |
| AJo | KJo | QJo | JJ | JTs | J9s | J8s | J7s | J6s | J5s | J4s | J3s | J2s |
| ATo | KTo | QTo | JTo | TT | T9s | T8s | T7s | T6s | T5s | T4s | T3s | T2s |
| A9o | K9o | Q9o | J9o | T9o | 99 | 98s | 97s | 96s | 95s | 94s | 93s | 92s |
| A8o | K8o | Q8o | J8o | T8o | 98o | 88 | 87s | 86s | 85s | 84s | 83s | 82s |
| A7o | K7o | Q7o | J7o | T7o | 97o | 87o | 77 | 76s | 75s | 74s | 73s | 72s |
| A6o | K6o | Q6o | J6o | T6o | 96o | 86o | 76o | 66 | 65s | 64s | 63s | 62s |
| A5o | K5o | Q5o | J5o | T5o | 95o | 85o | 75o | 65o | 55 | 54s | 53s | 52s |
| A4o | K4o | Q4o | J4o | T4o | 94o | 84o | 74o | 64o | 54o | 44 | 43s | 42s |
| A3o | K3o | Q3o | J3o | T3o | 93o | 83o | 73o | 63o | 53o | 43o | 33 | 32s |
| A2o | K2o | Q2o | J2o | T2o | 92o | 82o | 72o | 62o | 52o | 42o | 32o | 22 |

- Need to put in 3000 after which the pot would be 6500, so need 46% equity.
- However, there are 2 players behind, which is a factor to consider.
- A8s has 48% equity…just good enough.

# Uh-oh! Monster behind wakes up?

# Analysis with KQhh

- BTN has 11.8%

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AA | AKs | AQs | AJs | ATs | A9s | A8s | A7s | A6s | A5s | A4s | A3s | A2s |
| AKo | KK | KQs | KJs | KTs | K9s | K8s | K7s | K6s | K5s | K4s | K3s | K2s |
| AQo | KQo | QQ | QJs | QTs | Q9s | Q8s | Q7s | Q6s | Q5s | Q4s | Q3s | Q2s |
| AJo | KJo | QJo | JJ | JTs | J9s | J8s | J7s | J6s | J5s | J4s | J3s | J2s |
| ATo | KTo | QTo | JTo | TT | T9s | T8s | T7s | T6s | T5s | T4s | T3s | T2s |
| A9o | K9o | Q9o | J9o | T9o | 99 | 98s | 97s | 96s | 95s | 94s | 93s | 92s |
| A8o | K8o | Q8o | J8o | T8o | 98o | 88 | 87s | 86s | 85s | 84s | 83s | 82s |
| A7o | K7o | Q7o | J7o | T7o | 97o | 87o | 77 | 76s | 75s | 74s | 73s | 72s |
| A6o | K6o | Q6o | J6o | T6o | 96o | 86o | 76o | 66 | 65s | 64s | 63s | 62s |
| A5o | K5o | Q5o | J5o | T5o | 95o | 85o | 75o | 65o | 55 | 54s | 53s | 52s |
| A4o | K4o | Q4o | J4o | T4o | 94o | 84o | 74o | 64o | 54o | 44 | 43s | 42s |
| A3o | K3o | Q3o | J3o | T3o | 93o | 83o | 73o | 63o | 53o | 43o | 33 | 32s |
| A2o | K2o | Q2o | J2o | T2o | 92o | 82o | 72o | 62o | 52o | 42o | 32o | 22 |

- Need to put in 2800 after which the pot would be 9300, so need 30% equity.
- There are no players behind, so this calculation is exact. We don't need to add to the "min equity required".
- KQs has 36%! Way more than enough. Despite looking like a hand that needs to get lucky to win, it does VERY well in a 3-way pot.

# Cool Facts

- Hand with most equity against AA (other than AA)?

# Answer

- 65 suited, of a suit different than both Aces, has 23% equity!

# Cool Facts

- Most equity you could possibly have getting it all-in preflop?

# Answer

- KK vs K2 where you suit-dominate their 2, has 95% equity!

# Cool Facts

- Create a situation where you lose with 100% certainty, no matter what cards your opponent has.

# Answer

- 22 on XXXX2, where all the X's are the same.

# Who do you think has the most equity? (Hint: You'll be surprised)

# The hand with two overcards! By a sliver.

# WHICH HAND WOULD YOU TAKE NOW?

# It's an intense race! A cookie to anyone who guesses the turn.

# Everyone improves! Count cards…

# Hold! Brick! Low!
# Clubs always get there! 8-ball!
# My heart is feeling strong! Broadway!

# …Of course CutiePi314 wins.