

# How to Avoid Crowds in Mass Transit

This guide goes over basic strategies to avoid crowds on mass transit. The focus is on train-based transit, which is characterized by a relatively regular schedule, regular daily pattern of usage, and no significant differences in time...

Method 1 of 5:

## Selecting the location within the station where you will board the train

1.



### Understand how locations on the platform correspond to cars of the train

1. Some of the more modern mass transit systems, particularly those in East Asia (Seoul, Hong Kong, Beijing, and other parts of China) have platform screen doors that align with the doors of the arriving train and open in sync with the arriving train. Older mass transit systems have markers indicating where the train doors will be placed when the train stops. The platform screen doors and/or markers can give you an idea of how the train will stop.
2. Some mass transit system run trains of variable length. The station is designed to accommodate the maximum train length. How shorter trains stop can depend on the transit system. For instance, for the Bay Area Rapid Transit system, trains stop approximately in the middle, with a subtlety: while trains with an even number of cars stop exactly in the middle, trains with an odd number of cars leave an extra car's worth of empty space in the front. Some transit systems front-align, i.e., the front car always stops at a particular point regardless of train length. Others rear-align, i.e., the rear car always stops at a particular point regardless of train length.

3. Mass transit systems with variable train length generally display explicit information about the length of the arriving train in the electronic displays. Note that this information may not be available as part of the regular schedule because the length of trains may be a function of dynamic factors such as availability of cars and expected passenger load.
  4. Some stations have information on how trains of different lengths will stop. The information may be displayed dynamically (i.e., for the next train) or as static signage describing how various train lengths will be treated.
- 2. Determine the least crowded car and least crowded entrance within the car, for travel without transfers.**
1. Decide what is the car most likely to have seating space at the time that you board it if your only goal is to find space to sit. Subsequent crowding of the car is not too relevant.
  2. If space to sit is out of the question anyways, and your goal is to find a car that will have the least level of crowding throughout the journey, it is also important to consider the load at future stations.
  3. In general, the distribution of the load of boarding passengers at each station depends on the station layout. Cars that are closer to the entrance points to the station platform tend to be more crowded, since many people, including those who arrive "just in time" to take the train and those who don't try to reposition within the station, tend to take that car. Therefore, at the station where you are boarding, what matters is the design of *all* the stations *before* you.<sup>[1]</sup>
  4. A typical mass transit system will have reasonably similar designs for most of its stations, so you may be able to use publicly available heuristics on crowdedness for your mass transit system. For instance, for the San Francisco Bay Area Rapid Transit (BART), the middle cars tend to be the most crowded and the front and rear cars least crowded.<sup>[2][3]</sup> The same is true for Japan's train system.<sup>[4]</sup> For the F and L trains on the New York City's Subway system, the front cars of the 4-car trains are the most crowded, and the rear cars are the least crowded, whereas 6-car trains are more crowded in the middle.<sup>[5]</sup>
  5. Be cognizant of the length of the train when doing these calculations. If you expect the train to be longer than it is, you may end up waiting at a part of the platform where the train won't stop.
- 3. Consider how close your car will be to the train you will be transferring to, for travel *with* transfers.**
1. For BART, when transferring from shorter trains to longer trains across an island platform, it is particularly important to be at the front or rear car of the shorter train, otherwise you will be too far from the front or rear car of the longer train. However, when transferring from a longer train to a shorter train, it is more helpful to be at the car directly corresponding to the front or rear car of the shorter train being transferred to.
  2. Read the displayed information that is shown on some subway systems (such as Seoul's subway system), regarding what part of the station to board so as to make one's transfer most efficient.<sup>[6]</sup>
  3. If the crowdedness varies significantly for cars close to the entrance to the platform and cars far away, it may be better for you to forgo boarding a train if you arrive just in time at the platform, and instead board the next train for which you'll have time to reach the correct part of the platform. However, if you are able to enter in a car that has no seating space but has only a moderate number of people standing, you may be able to migrate within the train to a more suitable car (at the risk of disturbing some fellow passengers during your journey). Not all trains allow people to move between cars under ordinary circumstances.

4.



**Become familiar with any special rules that your transit system has for who can board what cars of a train.**

1. Mass transit systems in many parts of Asia (Japan, India, Malaysia, Indonesia), Mexico, Brazil, and some other countries have some train cars reserved for women.<sup>[7]</sup> In some countries (such as Japan) these women-only rules apply only during rush hour. Their purpose is to reduce the incidence of sexual harassment of females on mass transit. If you are a male passenger, make sure not to stand at the parts of the platform where the women-only cars stop. Females are generally allowed to board other train cars as well. If you are female, familiarize yourself with your mass transit system's conventions regarding boarding general cars. In some mass transit systems, such as Mumbai's suburban railway system, the women-only passenger cars can be more crowded on some routes during rush hour (since they account for only 25% of train cars and women can account for a larger fraction of travelers along some routes). Thus, a number of women avail of the general train cars.<sup>[8]</sup><sup>[9]</sup>
2. There may be restrictions on times you can board if you are boarding with a bicycle, or the level of crowdedness of the train when you can board. For instance, BART does not allow bikes in the first car, and does not allow bikes in the first three cars during rush hour.<sup>[10]</sup>
3. Some transit systems have special train cars with restricted access and higher ticket prices. An example is Mumbai's suburban railway system, that has "first class" coaches, where tickets cost 8 times the general ticket cost (however, with monthly passes the cost ratio is only 4). Part of the purpose of the high cost is to make the tickets sufficiently unaffordable that the "first class" cars do not get too crowded, so if you are averse to crowding this option might be worth availing.<sup>[11]</sup>

Method 2 of 5:

**Selecting your time of departure**

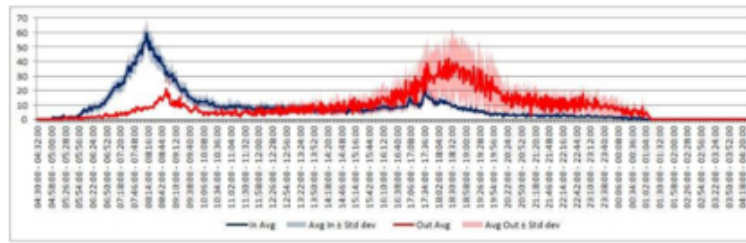


Figure 3: Finchley Central Weekday View



Figure 4: Canary Wharf Weekday View

1.

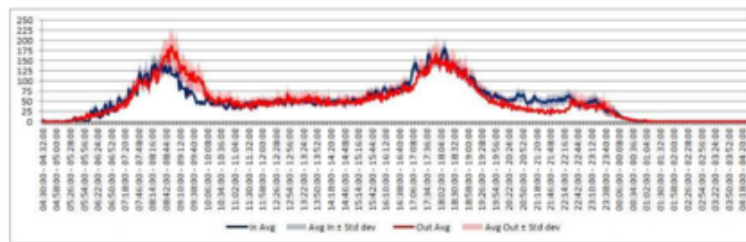


Figure 5: Waterloo Weekday View

**Figure out how crowdedness varies by the departure time of your train.** Research has shown that crowdedness can vary very heavily with even small changes in departure time, and that choosing a more suitable departure time can improve your travel experience.<sup>[12]</sup>

1. The simplest model is that crowdedness follows a two-peaked distribution, with the peaks occurring respectively during the morning and evening rush hours. If this simple model applies to your mass transit system, you should try to select travel times that are as far as possible from the respective peaks, subject to other constraints (such as when you need to get to work, what is the earliest you can get up, when you can get off, and when you need to get back home).
2. One complication is that transit systems vary both the frequency of trains and the length of trains by time of day. Therefore, the load you see in your train car may not scale in sync with the overall system load. One implication of this is that the load can be multi-peaked: for instance, there can be a peak during the actual morning rush hour peak, and there can be another peak when the rush hour service gets scaled down. Patterns vary heavily based on your mass transit system.
3. Another relatively minor complication arises in cases where the mass transit system has one key business/financial district or university stop that most commuters travel to. In this case, load tends to be maximum for trains that arrive at that financial district close to the start of an hour or half-hour, in line with typical reporting times for work or study. However, this phenomenon is usually not sharp enough because the business district is rarely that heavily concentrated.

2.



**If your station is a "tipping point" station, make sure you arrive sufficiently well in advance of your train's scheduled time so as to be at the head of the line for your train car.**

1. A "tipping point" station is one where the passenger load factor crosses from below to above 1, i.e., the train car you are interested in boarding goes from having a few empty seats to having a few people standing. Most stations aren't tipping point stations: for most stations, either the passenger load factor both at the start and the end is less than 1, or the passenger load factor both at the start and end is greater than 1.
2. Based on the load patterns for your morning transit, you should be able to figure out whether your station is likely to be a tipping point station (note that the tipping point station can vary by daily fluctuation, however, for a given time of day and a given car, it is usually one of 2-3 adjacent stations).
3. If your station is a tipping point station, it matters whether you are among the first or the last to board the train car. In this case, being a little early to board your train car can make the difference between getting a seat and not getting a seat. You need to observe when the line for your train car starts forming in order to determine your optimal arrival time.
4. If you are at a tipping point station, and you arrive just in time to catch a train it may be better to let it depart and catch the next train, assuming approximately equal levels of crowding.

Method 3 of 5:

## **Gaming the system with alternative routes**

### **1. Consider boarding at a different station.**

1. If you are close to two stations, boarding at the station earlier in the line can allow you to get a less crowded car. Note that this is particularly important if the station you usually board at is a tipping point station.
2. The flip side is that the cost and time for travel may increase a bit. The details depend on whether your transit system uses a fixed fare or variable fare model, and, in the case of variable fares, on the specifics of how the different origin stations differ in terms of the fares to your destination.

2.



**Consider riding in the direction opposite that of travel and then transferring.** For instance, you might consider a brief ride to a station that is earlier on your line, by boarding a train in the opposite direction. Essentially, ride in the opposite direction as far as needed so as to get before the tipping point.

1. With most mass transit systems, within-system transfers are free and you therefore do not incur any additional direct financial costs. However, the Paris Metro is an exception: for many stations, you need to exit the system in order to be able to board the train going in the opposite direction (however, for those with unlimited passes, which are not too expensive in Paris, exiting and re-entering the station imposes no additional cost). Therefore, make sure that you have confirmed that it is possible to switch to the line in the other direction at no additional cost before you consider this strategy.
  2. This strategy increases your total travel time for two reasons: you now have added a two-way journey to a point farther up the line, and you have added an additional transfer between trains.
  3. The strategy does not decrease the overall crowdedness of your train car. It may, however, allow you to get seating space in your train car.
  4. Any benefits you accrue in terms of getting a seat are nullified at your next transfer point. Thus, this strategy does not make sense for a short first leg of a journey.
3. **Consider investigating unconventional route transfers for a complicated system.**
1. This strategy may be relevant if your subway system has many different crossover points for transferring between lines. Examples of subway systems with sufficient complexity to make optimization useful are those of Paris, Beijing, and Seoul. In fact, there is empirical evidence of significant numbers of people taking longer routes in Seoul to avoid crowds.<sup>[13]</sup>

Method 4 of 5:

## Enduring the crowd

1. **After boarding, move to a part of the car that is presently less crowded and is less likely to get crowded.** However, note the exception for the first leg of a transfer.
  1. People usually cluster near the doors, for a variety of reasons that have been the subject of psychological study.<sup>[14]</sup> The areas farther from the door, which may be in the middle of the car or at

the ends (depending on the car design) may therefore be a better place to stand.<sup>[2]</sup>

2. Keep in mind one downside of this: if you are farther from the door, there is a larger mass of people to wade through when exiting the train. If the train is likely to be crowded at the time you exit, you need to weigh that downside.
3. If this is a short first leg of a trip (i.e., you intend to transfer to another train) it may be preferable to stay close to the door so that you can exit faster and make it more quickly into the other train.
4. As a general rule, it is easy to move within the train if the passageway has a single column occupied and can accommodate two columns, or has two columns occupied and can accommodate three columns. If this is true at your point of entry and exit, but the train becomes more crowded in between, these strategies are worthwhile.



2.

**Follow the standard conventions of your mass transit system to minimize the space you take and the extent to which you antagonize fellow passengers.**<sup>[15]</sup>

1. On mass transit systems with moderate levels of crowding but generally good safety records, it is recommended that, if you are carrying backpacks, you place them in front of or between your feet.<sup>[2]</sup>
2. On mass transit systems that endure very heavy crowding, placing your backpack at your feet risks getting separated from it, due to either pickpockets or the movement of the crowd. On such systems, it is recommended that you travel light. Some people follow the practice of wearing the backpack on their front so as to minimize the risk of theft and separation from their property.<sup>[16]</sup>
3. Make sure to hold on to handrails. Crowds can get more frustrating if you keep bumping into people when the train changes direction or stops or starts suddenly.
4. Avoid making loud noises or otherwise drawing attention to yourself as that can get you into fights with others in the crowd and ruin your day. This is particularly important in very crowded transit conditions and at high temperatures.<sup>[17]</sup>

Method 5 of 5:

## **Avoiding bad situations**

1. **Stay aware of system-wide delays.** Sign up for email alerts, Twitter notifications, or any other appropriate notification service from your transit agency. This allows you to be informed of system-wide

delays before you enter the system.

1. In the case of a system-wide delay, you have to trade off two factors: given that the travel time is greater, you need to enter earlier in order to reach your destination on time, against the fact that delay and crowdedness are high right now and will likely return to normal if you delay your travel. You need to understand the situation based on your knowledge of how quickly the transit agency recovers from delays and other factors to make an informed judgment.
2. **Stay aware of other factors that cause high crowds (even in the absence of system delays).**
  1. Sporting events, music festivals, and political rallies can cause some routes to get highly crowded for particular time ranges. If you do not intend to attend the specific event, and have some flexibility regarding the time or route of travel, try to avoid the crowds.
  2. In some cases, problems with alternative transportation modes (such as traffic jams on highways) can lead to greater crowding on mass transit.
3. **If you see a train that is more crowded than usual, be smart about whether to board it.**
  1. Listen for controller, station agent, or train operator announcements that explain the situation, including information on whether the extra crowding is a feature of that train alone or a system-wide delay.
  2. If another less crowded train is right behind, the operator will usually announce this.
  3. Use your general understanding of how load varies with time of day to make an informed judgment. If load is still increasing (i.e., the current time is *before* the rush hour peak) then boarding now is better than boarding later. If load is decreasing in expectation, it may be better to delay boarding.
  4. Consider riding in the opposite direction, as discussed in Method 3.
4. **In bad situations, consider using alternative transportation modes.**
  1. Consider walking, driving, taking a bus, or using an on-demand transportation service.
  2. The train system may suggest alternative modes of travel, and may even offer discounts on the use of these alternative modes of travel in order to alleviate crowding.

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