

Confusion: A Leading Cause of Waste

How Lack of Certainty Translates to Unnecessary Product and Packaging Waste

The large excess of avoidable waste globally exerts a monumental impact on our society and environment. There is a large disproportion between the amount of edible municipal solid waste and the number of Americans going to bed on an empty stomach. This urgent issue begins at the consumer level, where most people are confused about the labelling on food and drink products, the practices and processes of how to correctly recycle and the ambiguity around people identifying their own property.

This highlights the importance of confusion on consumer/user behaviours when complying to sustainable practices in order to reduce the global issue of waste. Simply, if

the systems in place are not clear and easy to comprehend and do, things will be unnecessarily thrown away, ultimately piling up our landfills.

One approach to solve this pressing issue may be standardizing the labelling and/or packaging systems to reduce any confusion or misinterpretations, which contribute to the growing amount of solid waste in our landfills. Also, consideration of key players that drive users to exhibit attitudes toward better recycling practices calls for a need to promote education of the general public so that there is global awareness of this serious problem and an understanding of what we can do to mitigate the severe consequences in order to achieve a more sustainable future for waste.



What Is the Problem?

Our world struggles with feeding the population, with 690 million people around the world going to bed on an empty stomach (WFP, 2021). Despite this, we have a global food waste crisis estimated to be at approximately 1.6 billion tons every year (FAO, 2017). Of this, 1.3 billion tons is actually edible and equates to an enormous value of \$750 billion (FAO, 2017).

This issue has a significant impact on our society and economy and poses a huge threat on our environment and ecosystem. Greater waste drives a spike in food prices and consequently increases food shortages and demand for agricultural production. Environmentally, waste in landfills results in excess consumption of freshwater and fossil fuels as well as significant amounts of methane and carbon dioxide emissions (specifically from food decomposition).

This issue begins at the consumer level, as unnecessary waste is highly correlated with consumer behaviors resulting from a simple emotion of confusion. This can be confusion arising from ambiguous product labels, unclear understanding and lack of knowledge of correct recycling practices and even at a personal level such as the inability to identify our own drinks at a social event. This white paper will address these factors leading to avoidable waste as well as possible solutions to tackle the problem.



Consumer Confusion with Product Date Labels

Annually, food waste in the United States is estimated to cost around \$160 billion, accounting for resources involved in food production, distribution and marketing (Leib et al., 2016). This significant figure indicates a huge lost opportunity to feed millions of food-deprived households in the United States. Approximately 30-40% of the food supply is wasted in the United States, and in 2010, the United States Department of Agriculture's (USDA's) Economic Research Service estimated approximately 31% of food was wasted at retail and consumer levels, corresponding to around \$161 billion worth of food (USDA, 2010).

This enormous amount could have helped and fed deprived families but instead was sent to landfills to decompose. The role of consumer attitude and behavior in avoidable waste is largely significant; therefore, understanding consumer behavior will help better understand the causes of food waste and the outcomes resulting from changes to mitigate wastage of food. Research shows that product labels may be a potential avenue for reducing food wastage.

We can all admit that date labels on food and drink products are very confusing. More often than not, it seems to be common practice to discard products when they are near the date posted on the date label for perceived food safety or quality reasons. A collaborative survey including Harvard's Food Law and Policy Clinic, John Hopkins Center for a Livable Future and National Consumer League observed 84% of surveyed consumers admitting to always/usually or at least occasionally discarding food near or past the labeled date on the product package (Figure 2) (Leib et al., 2016).



■ **Figure 1.** Best before label on a food product.

These date labels found on products are unregulated and very inconsistent therefore making it confusing for consumers (Leib et al., 2016). Additionally, most of the study participants (58%) in another study admitted to throwing food away that was yet to "go bad" but still did because it "wasn't worth the risk" (Kavanaugh & Quinlan, 2020).

84% of consumers at least occasionally discard food close to or past the date on its package



There is a lot of confusion with these myriad date labels, such as understanding the differences between “sell by,” “best by” and “use by” labels. Consumers misinterpreting these labels is one of the leading causes of unnecessary food discardment. One study conducted in the UK attributed date label confusion to 20% of consumer food waste (Lyndhurst, 2011). The common practice of discarding food products past their labeled dates is fed by the misconception that the date is an indication of its safety.

However, for almost all products, these dates are estimations set by the manufacturer describing how long the product will be at its “peak quality.” Commonly mistaken for safety labels, these date labels are actually rough indications of the product quality, and with the exception of a few products, most food products remain safe to eat long past their expiration dates (Leib et al., 2016). The lack of clarity around the meanings of these labels makes them very difficult for consumers to understand.

There is a wide range of diverse interpretations of the meaning of date labels used in food products today. In the United States, the regulations around open date labels differ by state; therefore, there is no common or standard terminology used on food products.

Figure 2. How often the average U.S. consumer discards food near or past the labeled date on its package (Leib et al., 2016).

The Harvard Food Law and Policy Clinic, John Hopkins Center for a Livable Future and National Consumer League survey also gathered information about what the average consumer thinks the labels define (e.g., safety, quality, etc.) (Figure 3).

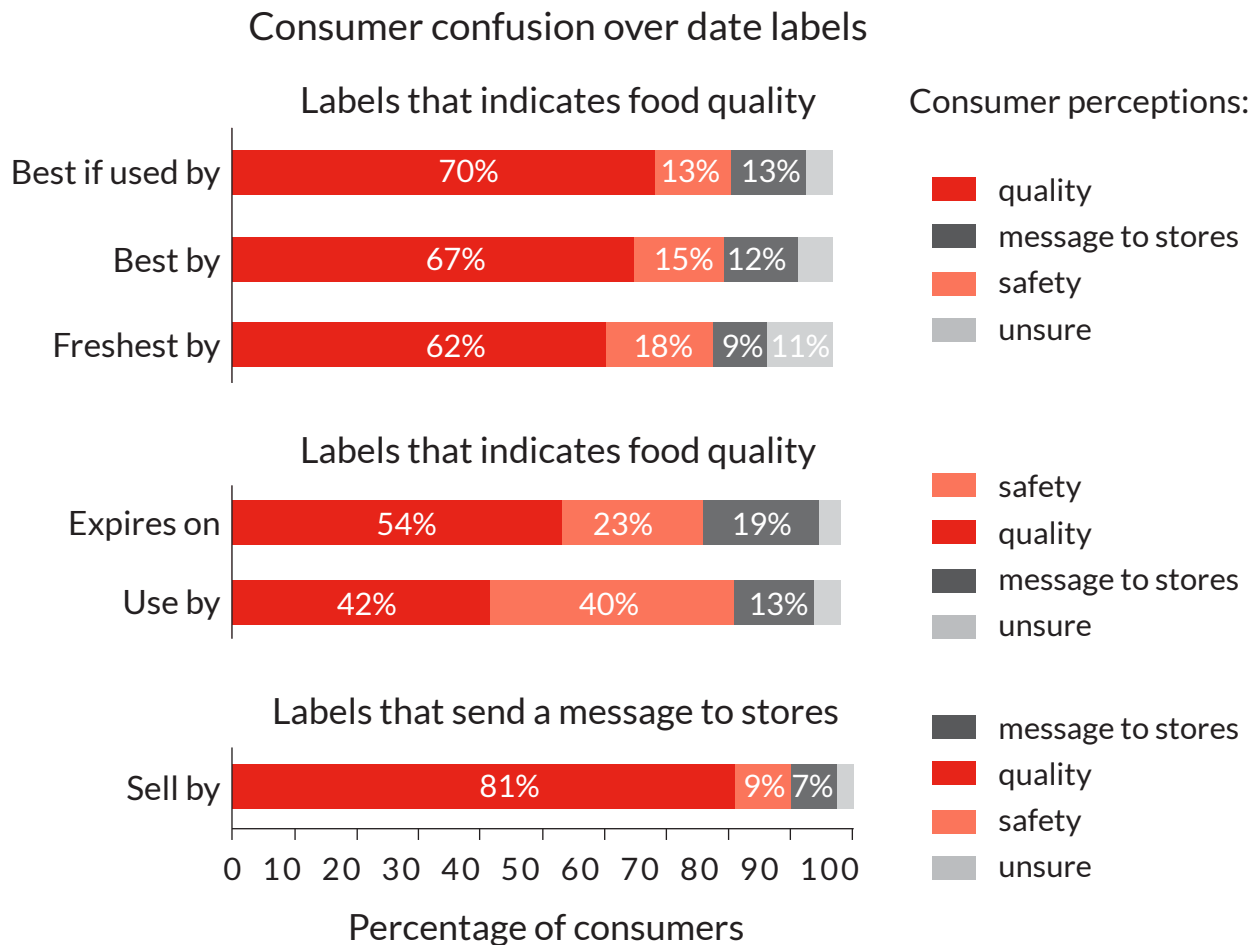
Labels such as “Best Before” are sometimes misunderstood to be associated with microbial safety rather than product quality or freshness. Meanwhile, “Use By” labels are perceived to roughly imply safety and quality. To mitigate this confusion, homogenizing labelling and terminology may be a useful solution for everyone to easily understand the labels.

One study clearly defined the meaning of the different date labels that are currently used (Tsiros & Heilman, 2005). “Sell By” seems to be pure information for the retailer selling the product that the date labeled is the last date for which the product can be displayed for sale purposes (Tsiros & Heilman, 2005). It does not indicate anything related to a product’s safety or quality.

“Best if Use By”, “Best Before” or “Best By” can be used interchangeably (and therefore are confusing), which together all mean that the time after the labeled date is when the product’s quality or flavor may deteriorate (Leib et al., 2013; Newsome et al., 2014; Tsiros & Heilman, 2005). “Use By” is a recommendation of the last date by which the product should be consumed but does not necessarily convey any safety precautions (Tsiros & Heilman, 2005).

Less common labels that can be used by food manufacturers, such as “Fresh By” or “Enjoy By,” lack clarity from a consumer’s point of view, as neither officially imply product safety or quality. Therefore, most consumers will make an assumption about safety or quality and act accordingly. As a consequence of date label ambiguity and inconsistency, there is increasing disposal of safe and edible food, all of which can be avoided to feed millions of food-deprived Americans.

Figure 3. How often the average U.S. consumer discards food near or past the labeled date on its package (Leib et al., 2016).



Uncertainty of Correct Recycling Practices

There is growing public awareness of waste and its disastrous environmental and economical consequences. With more businesses using paper instead of plastic bags and straws, more people are motivated to be more environmentally friendly. Despite the motivation, uncertainty seems to be a big barrier to improved recycling. Surprisingly, a large number of people are unclear on how to properly recycle; therefore, careless dumping leads to recyclable material piling up in landfills, eventually causing harm to our environment. For this reason, promoting interventions that educate the general public may be a potential way to increase engagement in recycling correctly and efficiently. If the processes or practices are not clear and easy, many of us will easily throw things away.

A striking number of Americans support the idea of recycling, many of which consider it to be a top priority. However, despite this enormous support, only a small proportion of these people actually recycle. One of the major causes of this disconnect seems to come from confusion and lack of information on these practices. Notably, the lack of clear standards for recycling and waste management conveyed to users seem to be a large point of concern and confusion (Henriksson, Akesson & Ewert, 2010). Previous surveys have reported a strong, significant correlation between knowledge of correct recycling practices and recycling behavior (Wright, 2011). This indicates the knowledge on how to properly and correctly recycle seems to be indicative of an individual's likelihood of recycling (Wright, 2011).

Older studies support this idea, observing that knowledge about recycling is the greatest difference between recyclers and non-recyclers (Vining & Ebreo, 1990).

It is very evident that communicating information has a significant impact on the practices and processes of recycling in different settings, such as at home and the workplace. Recycling methods have some degree of regulation, and they vary depending on the setting, such as a workplace/company, schools, churches, restaurants and malls.

Some settings may work using “single stream” or “commingled” recycling, where people can dispose of all things recyclable, such as glass, paper, cans and plastics, into the same bin. While convenient for consumers, this is not efficient, as different types of recyclable material will have to be further processed and separated. Other settings may be more efficient and separate different types of recyclable material. The lack of consistency and clarity gives an overall impression to users that recycling practices are not important and are of low priority, which is definitely not the case.



Figure 4. A confusing range of different labels currently used for recycling in the U.S.

Which one is mine?

As discussed earlier, the issues of unclear product date labelling and recycling practices are very important. This then raises the question of confusion at a personal and lifestyle level contributing to avoidable waste such as consumers being unable to identify their own things like their own drink at a social gathering.

This is especially important in large group or social settings (e.g. large sporting events or music concerts) where there are huge crowds of people around with identical looking drinks. Due to the nature of the setting, it is very easy to get confused about whose drink is whose, with a high likelihood of picking up someone else's drink.

Therefore, the confusion around this may lead to consumers unnecessarily throwing away the drink, which is an effortless and convenient task. Unfortunately, the nature of human behaviour is that if something is not easy and convenient, we will not comply or follow through with the process. As a result, a simple and easy approach should be considered to help individuals identify their own belongings and avoid any mix-up when out in public spaces, which in turn should help with preventing any unnecessary waste. This will pave a more sustainable future for everyone.



Food for Thought

It is clear that confusion is a huge issue leading to a significant amount of unnecessary waste. As explained earlier, a lot of people are confused about how to interpret date labels found on food and drink products, understand the correct methods and practices of recycling and even simple and small things like identifying their own drink in large gatherings or social events.

Standardization of date labels on products and recycling labels may be a potential idea to solve the issue of avoidable waste in the long run. Homogenizing the terminology used by manufacturers to suggest peak product quality will be much better received by consumers. Research shows that consumers who understood the correct definitions of date labels were less likely to throw away potentially edible food (Kavanaugh & Quinlan, 2020). Similarly, using common labels for recycling purposes can minimize confusion rather than trying to understand interchangeable labels and their meanings. This will be clear for anyone to read, regardless of where they reside or work. However, this implementation alone is not sufficient, and education and training will be necessary to reinforce the message.

Another possible solution to reduce unnecessary waste may be to invest in educating the general public on confusing terminology of product date labels and step-by-step methods on how to correctly recycle. This could be implemented using clear and concise diagrams or signage as well as taking advantage of our digitally advanced era by informing the public using media coverage on all platforms. In one study, providing adequate information about what to recycle was significant to an individual's recycling behavior at home (Perrin & Barton, 2001).

A similar study observed a positive influence of publicity and promotion on household recycling behavior and a positive association between recycling knowledge and household waste recycling behavior (Evison & Read, 2001; Grodzińska-Jurczak et al., 2006; Vicente & Reis, 2008). Therefore, this intervention may be able to encourage engagement and more awareness from the general public of the significant impact of unnecessary waste globally.

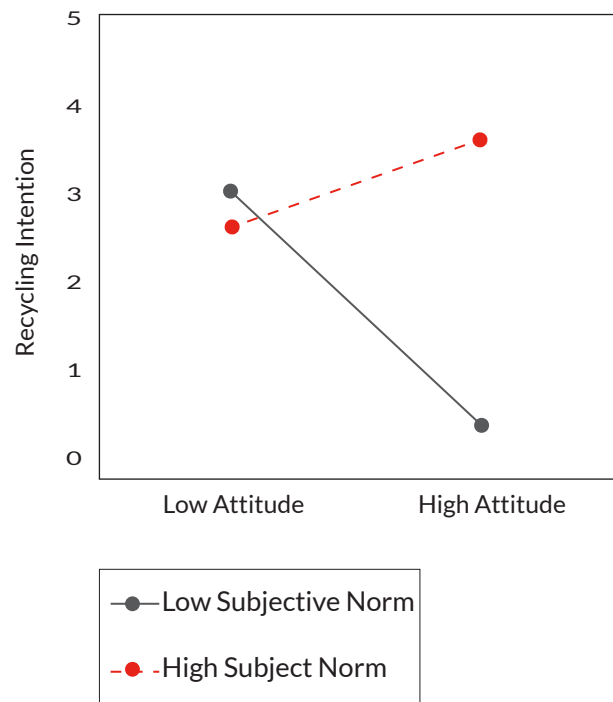


Figure 5. Higher perception of subjective norm and user attitude enhances the intent to recycle (Wan, Chen & Choi, 2017).

Interestingly, a factor to consider is the attitude of users toward the issue of unnecessary waste caused by improper recycling habits. Studies investigated the interaction between the effect of a user's attitude toward recycling and the intention to recycle. They suggest that subjective norms (i.e., behaviors a user thinks are considered socially acceptable) are a key contributor in motivating recycling behaviors (Wan, Shen & Choi, 2017). This can enhance more users to exhibit positive experiential attitudes (i.e., being aware of recycling as a good behavior) and motivate those who have limited knowledge and understanding of recycling to practice these behaviors.

An individual perceiving high levels of both experiential attitude and subjective norm were more likely to voluntarily recycle, indicating that subjective norms are important in encouraging recycling behaviors (Figure 5) (Wan, Chen & Choi, 2017).

Notably, individuals in a group setting that advocated or encouraged good recycling practices were more likely to recycle regardless of being aware of recycling benefits (Figure 6) (Wan, Chen & Choi, 2017). This is consistent with other studies, such as one that indicated that the interaction between subjective norms and a utilitarian type of attitude toward recycling (i.e., benefits of recycling) significantly motivated an individual to recycle (Huffman et al., 2014).

Therefore, instrumental attitudes (i.e., awareness and knowledge of recycling benefits) are less influential for people perceiving strong subjective norms. This reinforces the idea that perceived subjective norms seem to override an individual's motivation to act (i.e., recycle) despite limited knowledge. Therefore, promoting recycling practices may enhance attitudes of the general public to properly recycle and make our world a better and safer place.

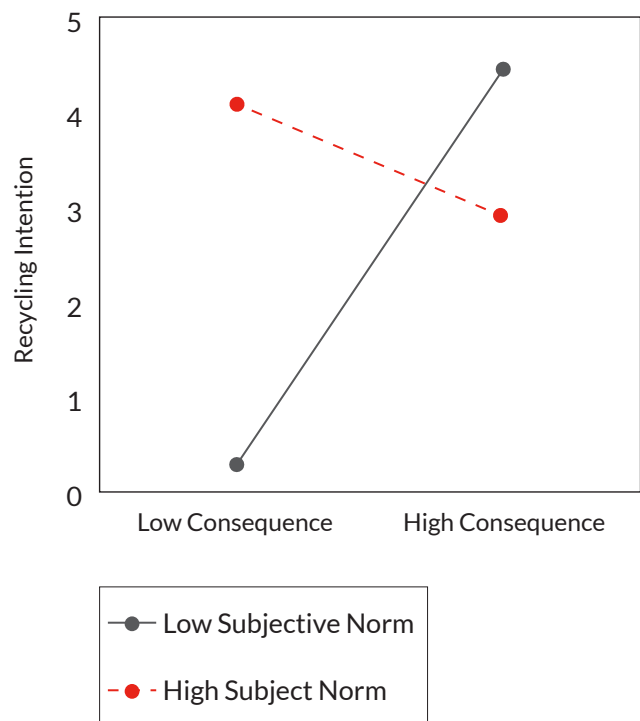


Figure 6. Higher perception of subjective norms regardless of awareness of waste consequences promotes recycling (Wan, Chen & Choi, 2017).

Plus Brand has created an all-scratch technology that can help solve the problem of unnecessary waste caused by confusion (Figure 6). This innovative technology allows you to label your own property, such as your drinks, so you can protect it and avoid others from claiming it as their own. This can eliminate any confusion as to whom the property belongs to, therefore reducing any unnecessary waste resulting from confusion (i.e., throwing away a drink because you don't remember if it was yours).

This is particularly useful and important in larger group settings, such as at a social event (e.g., concerts or basketball games), as people will be drinking the same drink that looks identical, making it more difficult to identify your own drink if unlabeled. Consequently, this creative technology ensures the health and safety of everyone.

The product is a sticker-like label, possessing patented physical and technical properties such as ink that is soft enough to scratch for labelling. This can resist a variety of different factors, such as heat, transport and water; can stick to a range of surfaces and can also be reused numerous times on other drinks. This innovative yet simple approach might just be the solution to avoid any confusion and therefore minimize unnecessary waste, making it more sustainable in the long-term for our environment.

Figure 7. Plus Brand's All-scratch Patch™ labels on drinks to avoid confusion.



Conclusion

Confusion seems to be a pressing issue, as research shows that it plays a monumental role in causing significant amounts of unnecessary waste in our world today. Simply, the date labels indicating food quality are way too vague and unclear for the average consumer.

Therefore, consumers are more likely to throw away waste due to misinterpretation of the meanings of these date labels.

Similarly, the lack of education and clarity of correct recycling practices contributes to the pile up of recyclable waste such as plastic in our landfills. The processes of recycling practices seem to be very unclear and prove difficult for the average user, ultimately leading to more people feeling indifferent to good recycling practices. Even the smallest of things causing confusion such as not being able to identify your drink at a sport's game can contribute to avoidable waste.

This reinforces the urgent need to find solutions to help reduce unnecessary waste at a consumer level. Consequently, this has a disastrous effect on the environment, as a large amount of it contributes to killing aquatic life.

This problem calls for the desperate need to potentially standardize these arbitrary labels to minimize any confusion for the average consumer/user. Interestingly, a new and simple approach, which includes Plus Brand's All-Scratch Patch label, proves to be exceptionally meaningful by reducing avoidable waste in a very simple way through labelling of one's property to avoid confusion.

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