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Article Critique: "Human Consumption of Microplastics"

I mostly just wanted this article for the consumption of microplastics based on seafood or marine life; however, it may prove plausible to show microplastic ingestion from multiple different spectrums. The article, titled *Human Consumption of Microplastics*, is based off 27 other studies in human consumption of microplastics and food chain logistics. The article goes over the collection of data, analysis, assumptions, and results of the findings of each of the studies and comprises them into one article.

While this article goes in depth from multiple perspectives, I mainly wish to show how the pollution of plastic into our rivers and oceans has true, lasting effects on our health, ecology, and economy, and this will be visible in the full literature review. The article's research question I believe is "What is the consumption of microplastics in humans and how does it affect human health?" There is a small weakness to this article in that it doesn't really go in depth with the effects on human health; however, the authors do a wonderful job in showing the consumption of microplastics, and go in depth about where these microplastics come from. One such location is from the ocean, from marine life.

Seafood is a major piece of a large number of countries diets and has a large impact on the healthiness of those countries' citizens. In Japan, citizens on average consumes approx. 105 grams per day of seafood (Cox, 2019, para. 17) and seafood is said to contain approx. 1.5x this amount in microplastics, leaving us with approx. 154 microplastics per day per citizen. Even though that number doesn't really mean much to someone just looking for a bite to eat, that is the current level today, whereas it may have been that forty-five years ago, that number could have been 0.2x or even 0.

This article does go into the actual data collection and analysis of the research, which was done with a literature review from numerous other studies addressing airborne and foodborne microplastics in the United States and some minor other countries. Much of which is data on the rates at which microplastics are ingested through air and food. Again, I only wish to show the ingestion of microplastics from seafood and marine life, but it gives an idea of just how far this has gone, logistically. Interestingly, the ingestion of airborne microplastics was based on the respiration (breathing) rate of an individual, and was separated by gender and age category, namely the natural join of male & female, child & adult. The sizes of plastics were also collected, with seafood containing the most diverse in terms of size of plastics. Most of the plastic found in airborne and foodborne consumption is fiber-sized and is very tiny.

After data collection, the analysis and assumptions created from the data allowed the authors to show the microplastic concentrations to be separated into categories. According to the article (Cox, para. 11), the average resulting value from a variety of 60 seafood species was approx. 1.49 calories based on a 15% caloric intake, which is all that the research accounts for. This means that out of our average recommended caloric intake of 2000 calories per day, 10 calories are microplastics. After a full year, we have consumed nearly two whole days of just microplastics, which could have an effect on our health. Being mindful of the fact that this is solely from seafood, there is a possibility that this number could be far greater since the study was done with other foods and air.

Overall, I think this article would be very strong for a full literature review, simply because it meets the criteria for most of the IMRaD checklist and is from a reputable source (I had to login with my mason id). While it may not be fully about the ocean or seafood in general, it is useful for showing just how microplastics play a role in the food chain and ecology of our world. I plan to use this article for possibly more than just this SDG paper in the future; I am a data scientist after all.

Kieran D. Cox, Garth A. Covernton, Hailey L. Davies, John F. Dower, Francis Juanes, and Sarah E. Dudas. *Environmental Science & Technology* 2019 53 (12), 7068-7074. DOI: 10.1021/acs.est.9b01517